

SPECIAL ISSUE: 5 Great New Macs

MACWORLD

THE MACINTOSH® MAGAZINE

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Mac IIvx



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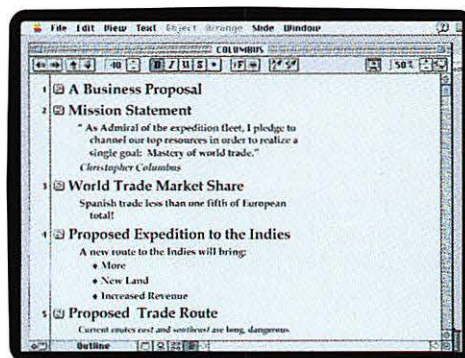
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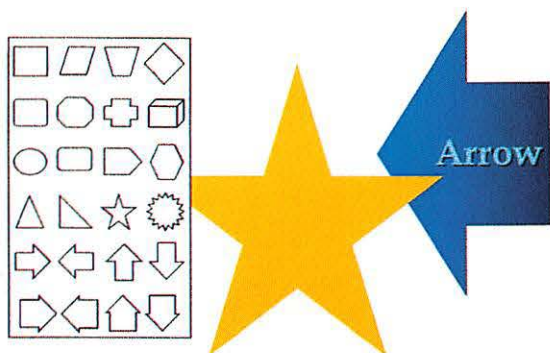
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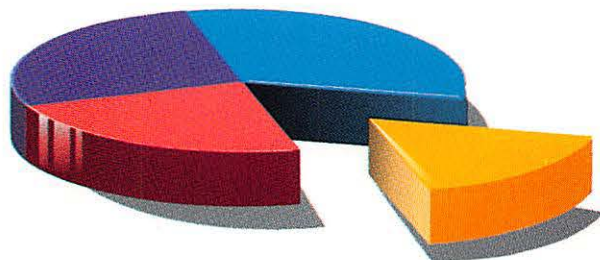
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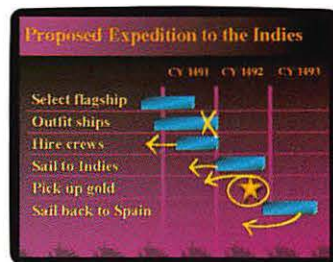
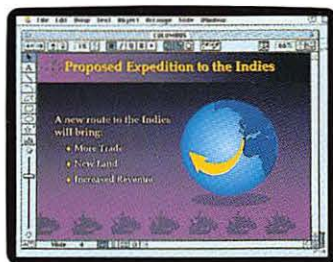
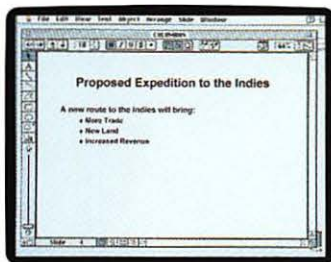
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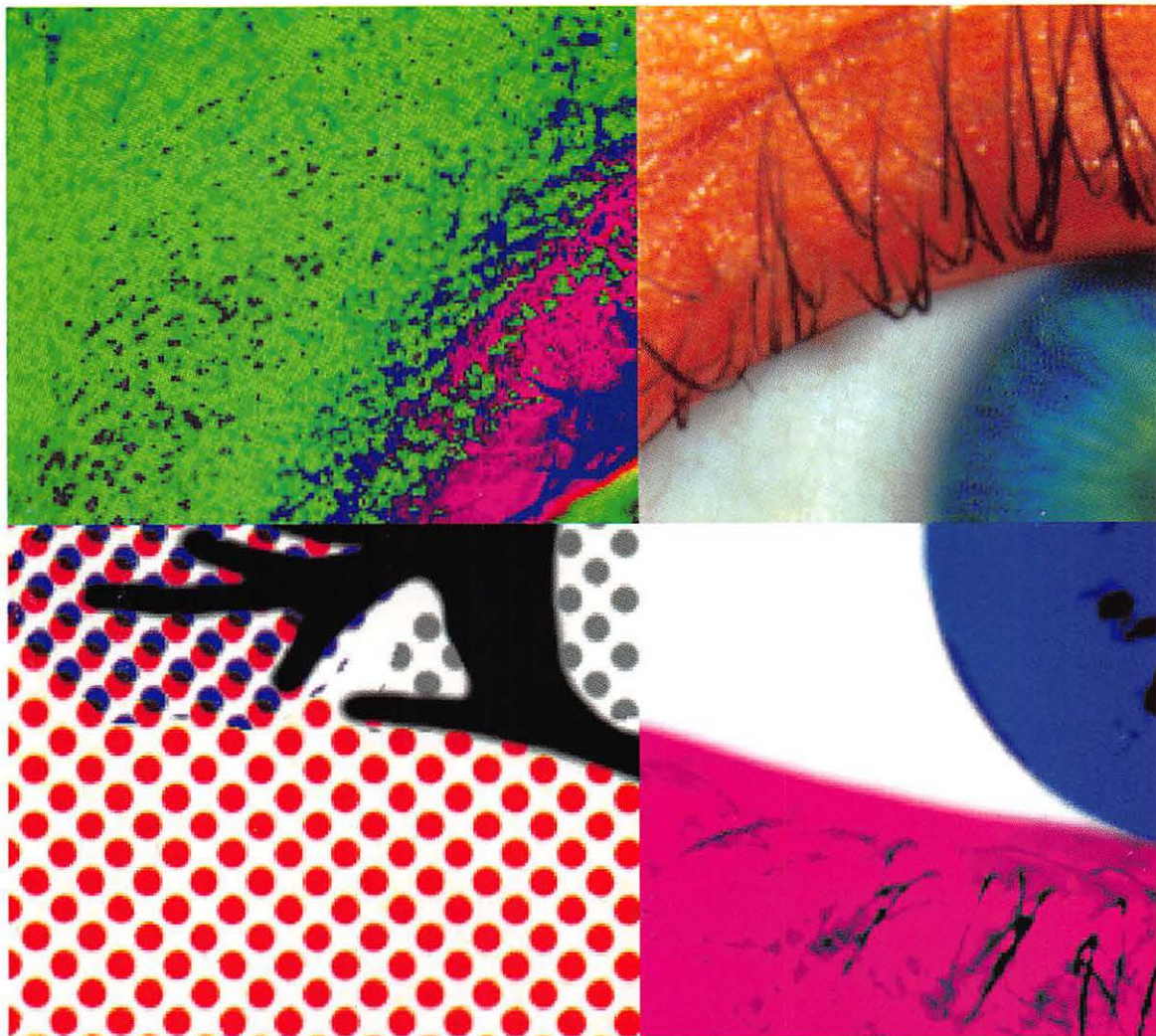
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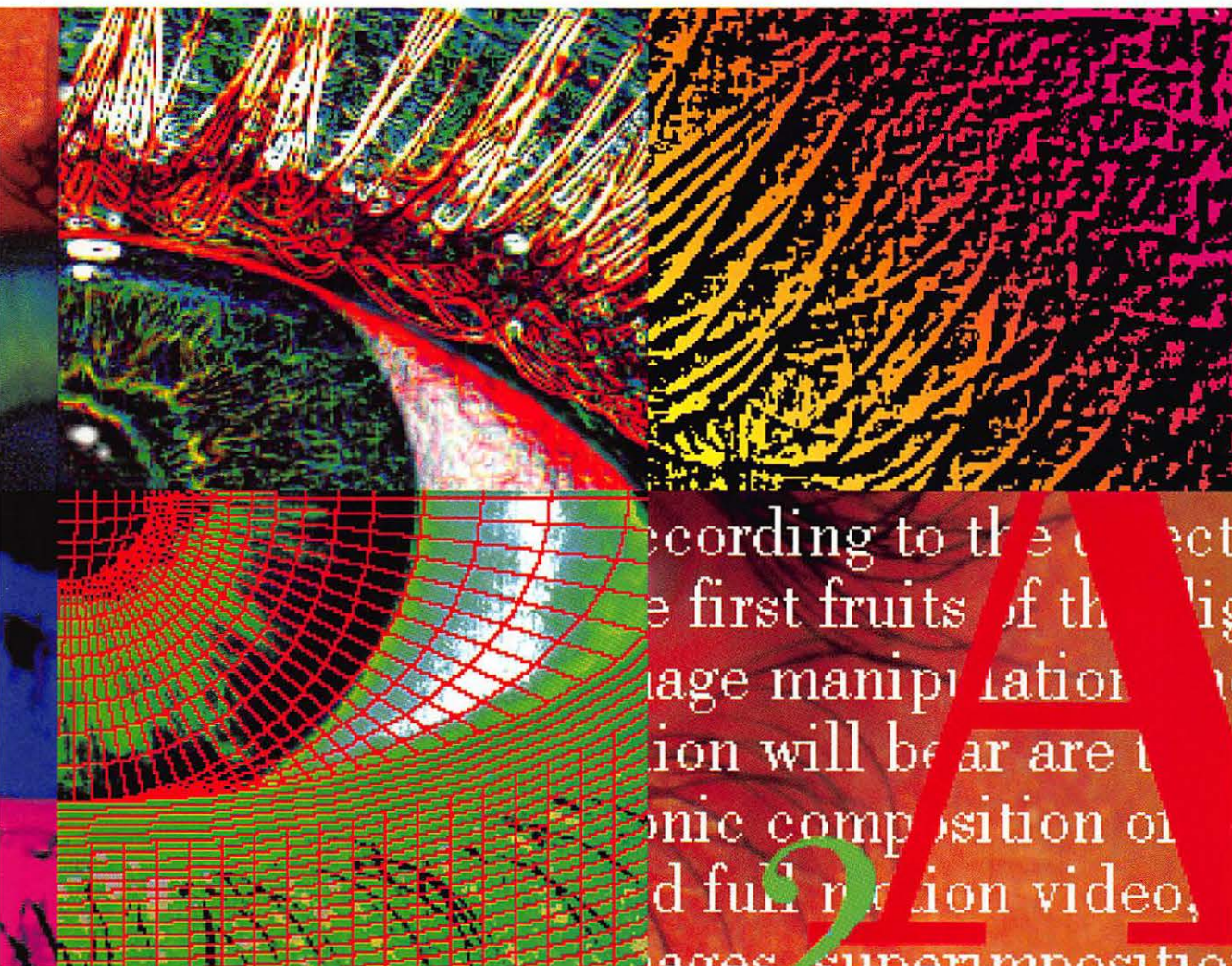
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Rolling out no less than five PowerBooks and a desktop champion—the IIvx—Apple escalates its new-product launch begun last month with the Performa line. (PHOTO BY PAUL FRANZ-MOORE; SCREEN IMAGES BY JIM LUDTKE.)

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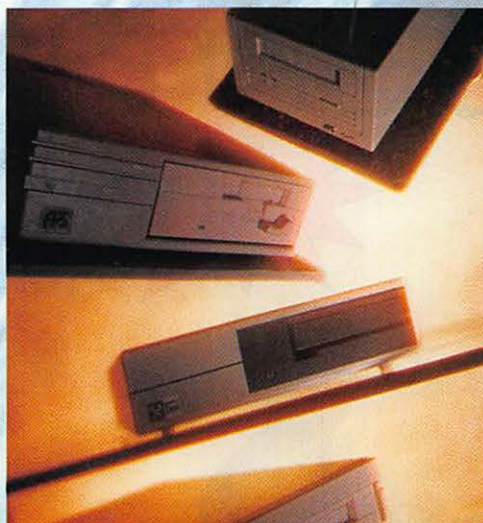


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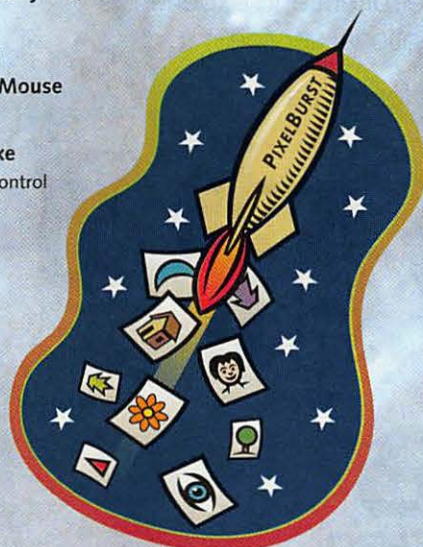
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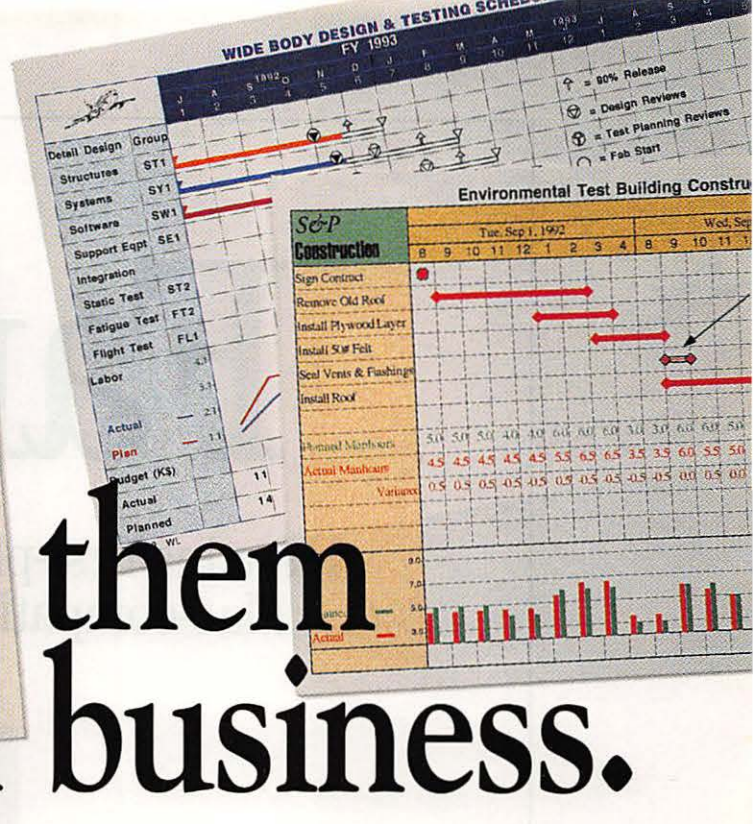
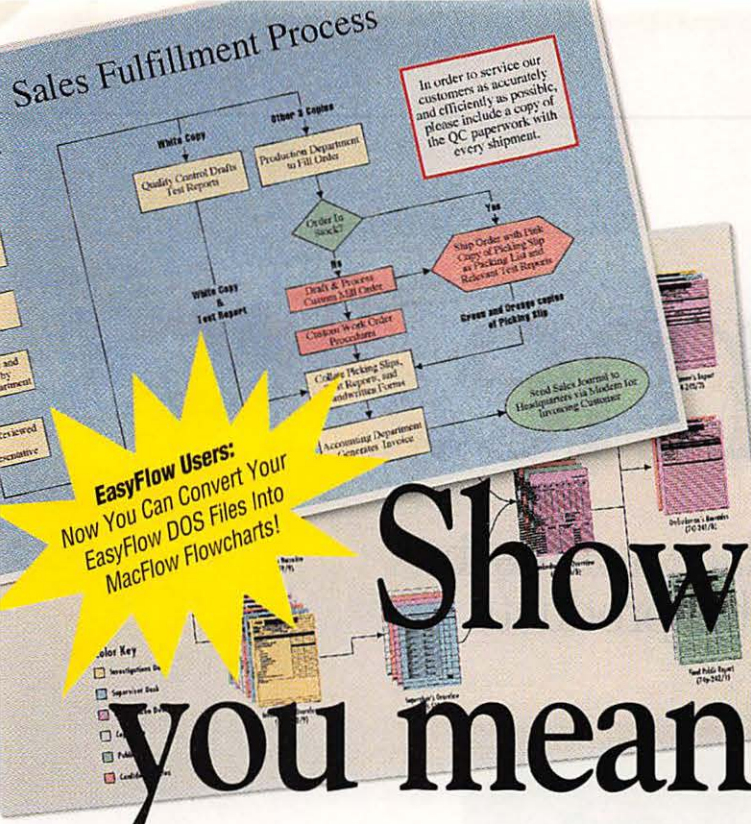
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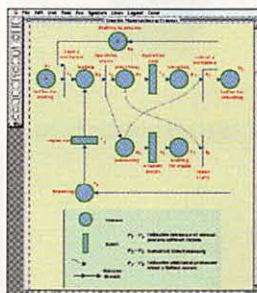
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MacUser Magazine July '91



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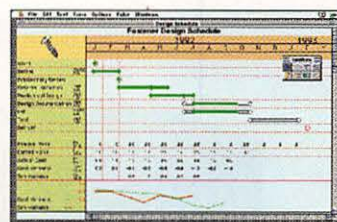
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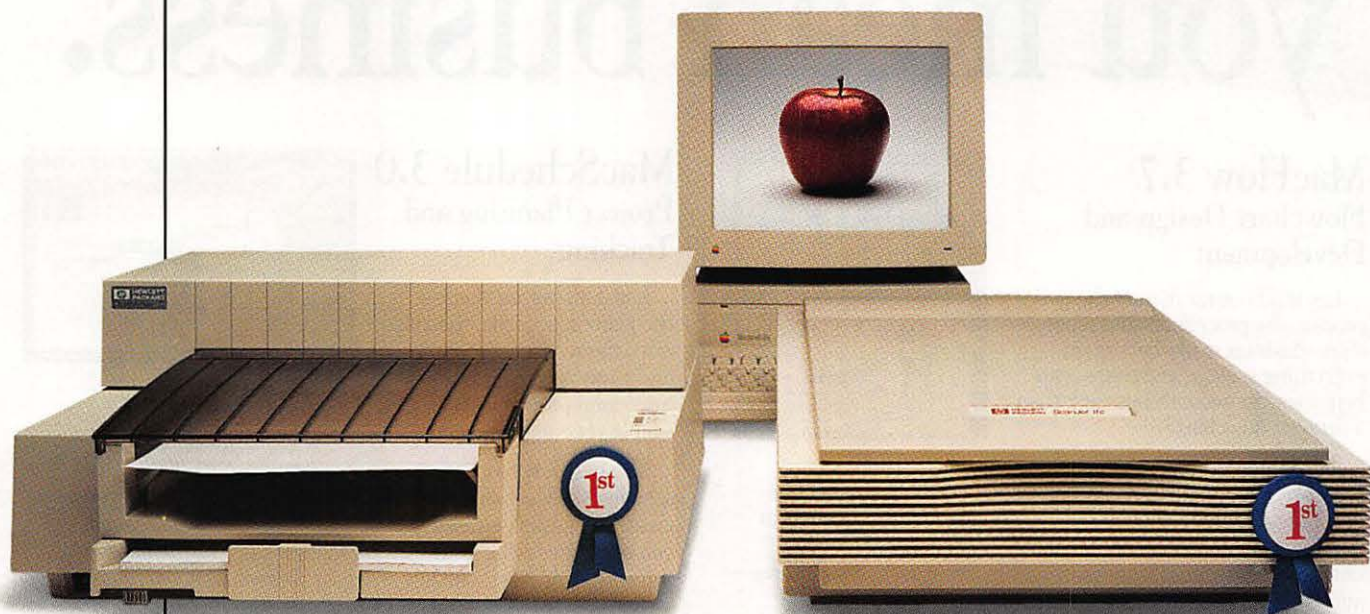
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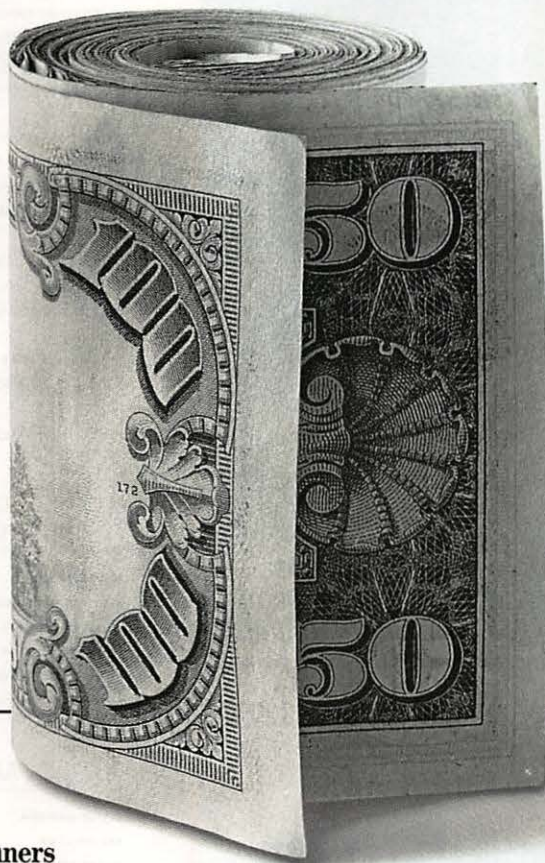
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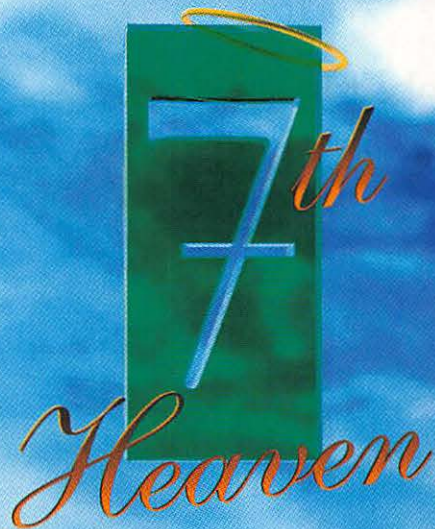
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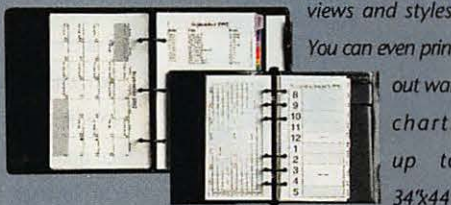
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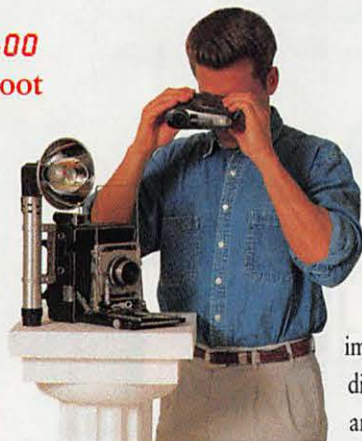
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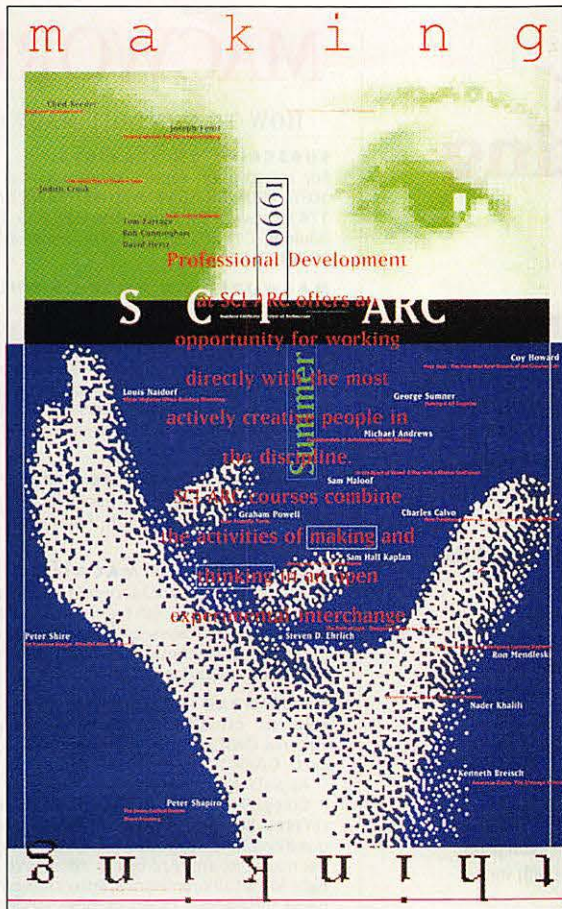
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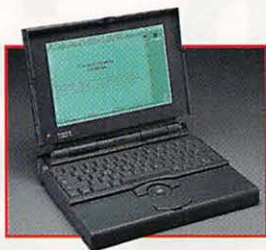
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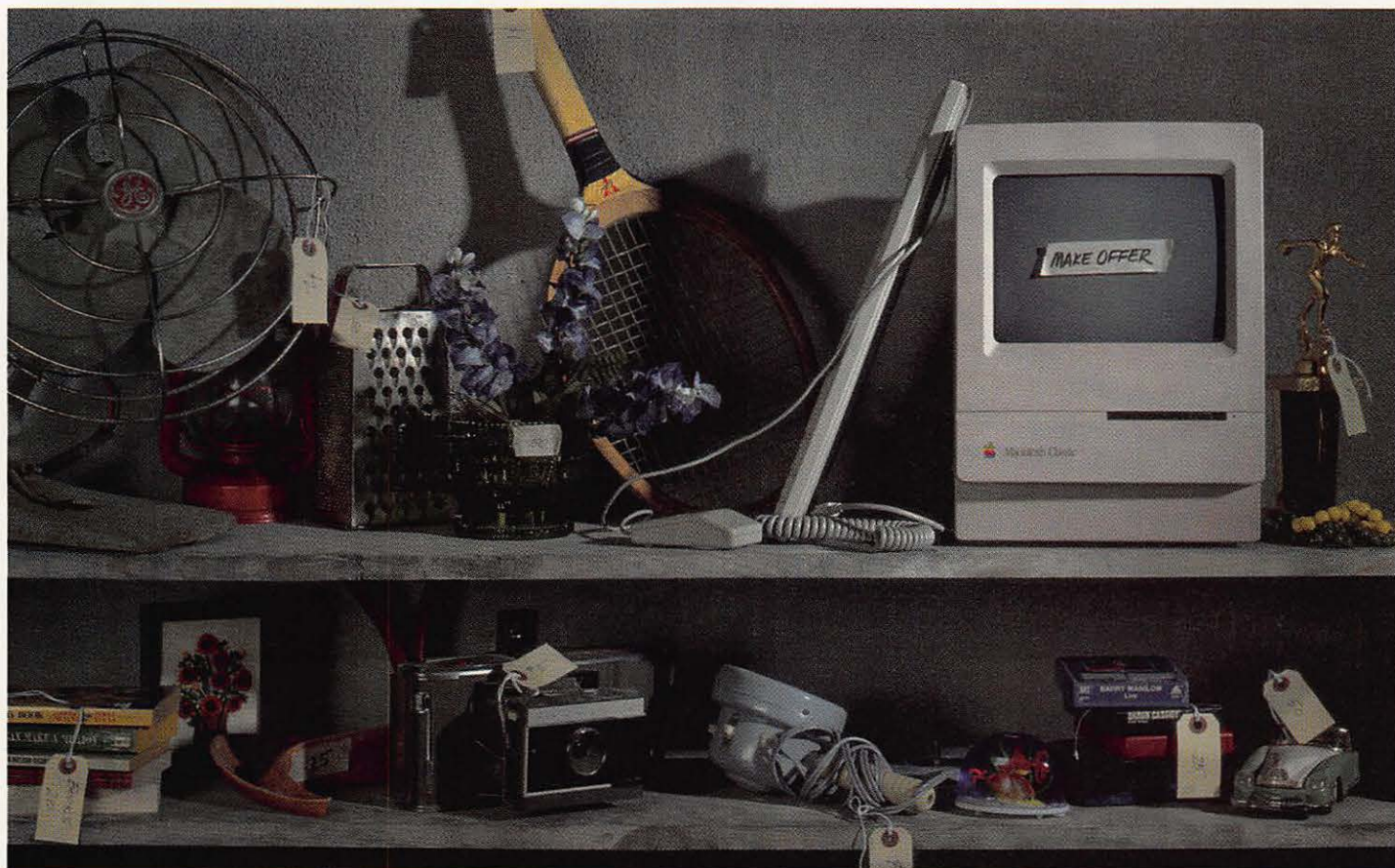
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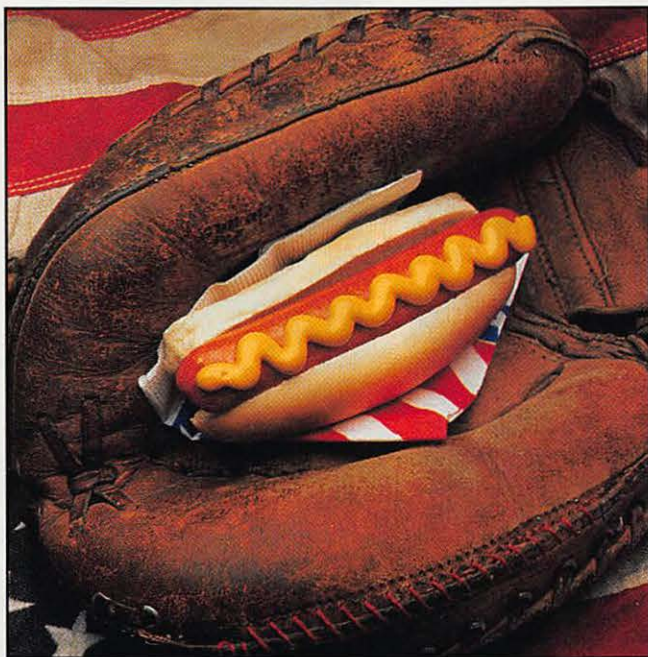
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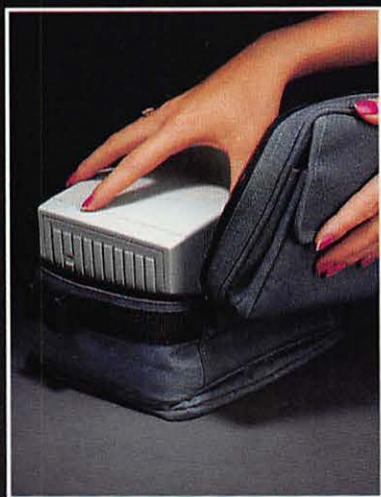


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MacBulletin

L A T E - B R E A K I N G N E W S

Early PowerBook 100s Recalled:

Apple said there was a possibility of a short circuit that can melt a small hole in the bottom of the computer's case. Owners of PowerBook 100s with serial numbers below SQ211xxxxxx or SS216xxxxxx should call 800/572-1731 to arrange for Apple to modify their systems at no cost.

QuarkXPress Revised: Version 3.2 of Quark's (303/894-8888) package can gather document components in preparation for taking them to a service bureau and compile a list of information the service bureau requires. The new version (\$895) supports UserLand Apple events scripting; has a next-style feature for text formatting; and ships with several XTensions including a color blend tool and an EfiColor color-calibration tool.

Apple cut retail prices on Macs in late September by amounts ranging from 11 percent to 36 percent. The steepest cuts were on models of the Classic II, the LC II, the IIsi, and the IIfx; the smallest cuts were on models of the Quadra 950. The Classic II 4/40 now lists for \$1079, and the Quadra 950 8/400 lists for \$8169.

Apple shut its Fremont plant and announced that it would lay off 345 workers as part of a worldwide restructuring of manufacturing and distribution. Many of the Fremont, California, plant's functions will be transferred to Sacramento. The moves are part of Apple's efforts to cut costs as the price war in personal computers continues.

Aiming to connect with IBM, Apple (408/974-4667) has introduced the Data Access Language Server, designed to provide Macintosh

users with transparent access to databases stored in IBM's AS/400 series of midrange systems. The SQL-based DAL Server should ship in December at prices that will vary by the number of users.

Apple and Kodak align, agreeing to cooperate on linking Kodak's Photo CD (a standard for digital photography on CD ROM) more closely to the Mac. Apple has said it will add Photo CD support to System 7 and future operating systems. Kodak said it will use Macs in its retail locations where Photo CDs are created.

Trapping Tool: Island Graphics (415/491-1000) is developing IslandTrapper for preparing complex color printing jobs. EPS files are imported into IslandTrapper, where users can examine and modify the program's default chokes and spreads before exporting to a color-separation package. IslandTrapper will list for \$2195.

Alias Sketch Upgraded: Alias's (416/362-9181) 3-D free-form drawing tool Sketch is being upgraded to version 1.5. The upgrade reads native Adobe Illustrator and Aldus FreeHand files; imports and exports IGES and exports RIB; supports cutting holes through objects; provides point and ambient lights; and has several new types of projection and environment maps. It lists for \$995.

On Schedule: Visionary Software (503/246-6200) is upgrading its reminder and to-do list manager First Things First to version 3.0. The new version has a global find command; lets users select and reschedule multiple items; and can assign items to a day without a specific time. Version 3.0 (\$79.95) includes a copy of DynoPage Lite. ■

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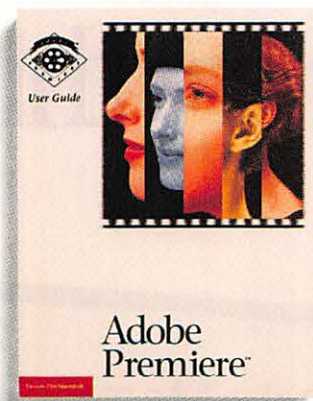
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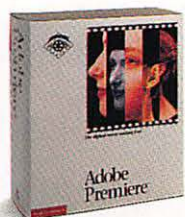
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The Decline of the Desktop Macintosh

BY ADRIAN MELLO

THE TIME HAS COME WHEN more and more desktops will give way to PowerBooks. Not just as an addition to a desktop Macintosh, but as a replacement. A year ago I wouldn't have dreamed that a notebook Macintosh could displace the desktop configuration. But the longer I've used a PowerBook, the more I've noticed a transformation in my attitude toward the desktop machines I use at home and at work. After taking the PowerBook on a few business trips, I began to greet my desktop machines with a certain reserve. A couple of trips later, I would just turn on the PowerBook and work on documents in front of my idle Mac IIci. Later yet, I became slightly irritated when I reached to turn on my desktop machine. What a difference between this reluctance and the enthusiasm I always felt when I turned on the PowerBook. It was almost as if I felt obligated to use the IIci because of its superior keyboard and display and an outdated notion that it was my core computer. In any case, it was becoming clear that I had changed allegiance to the PowerBook as my primary computer.

The PowerBook Conversion

THE FACT THAT MORE AND MORE PEOPLE are converting to PowerBooks as their sole or primary computer should not surprise those who experienced the original Macintosh design. The PowerBooks are a return to the original hardware virtues of the Mac: integration and portability. After all, the original model for the Macintosh was the Dynabook—a tightly integrated booklike computer that would work much like an electronic assistant. Although it might not seem convincing now, the original Mac was once considered portable. It was a comparatively light, one-piece computer (overlooking the small keyboard and mouse) with half the footprint of a standard-issue PC, and it could be toted around in an unassuming-looking satchel. PowerBooks obviously provide a much greater degree of portability, but the basic idea is the same. The not-so-portable original Mac also had its configuration limits when compared with the typical DOS machine, but the total package was so well thought out and so tightly

integrated that it was compelling to pioneering users.

The Fall of the Mac II

IF YOU DON'T BELIEVE THAT THE MAC II family will give way to PowerBooks, look at what's going on in the midrange of the Macintosh product line. One way to define the midrange is to say it's the price point around which most computing mortals orbit. Most of us can justify (or rationalize) spending up to \$3000, plus or minus \$500, for a basic CPU purchase (not including monitor and keyboard). Another way to define the midrange is by looking at which Mac models sit outside its bounds. The low end is covered by Classics, LCs, and their variants. The high end is Quadra territory.

Whichever definition you prefer, Apple's new product introductions indicate a drastic change in its midrange computer offerings (see "Looking down the Line" in this issue). For the past few years the midrange has been represented at any given time by two or three models of the Mac II. But now, the Mac IIsi and IIci will likely be discontinued as soon as corporations adjust their purchasing lists and Apple clears out its inventory. Those models will follow the original Mac II, the Mac IIfx, and the Mac IIfx into oblivion, leaving the new Mac IIfx as the sole remaining midrange Mac II.

The Rise of the PowerBook

ARE THERE ANY OTHER MIDRANGE MACS? Yes—mostly PowerBooks. There are now four new midrange PowerBooks (or five, depending on how you define the high end), including the PowerBook 145, the PowerBook 160, the Duo 210, the Duo 230, and toward the high end, the PowerBook 180. Where choice is concerned, the middle ground is largely defined by PowerBooks these days, not conventional desktop Mac II's and their two-letter variants.

So the question may not be whether to buy a PowerBook or a desktop Mac, but which PowerBook to buy. For many users portability is a key virtue—perhaps more impor-

tant than expandability, if from the outset the computer comes outfitted with enough power. The new PowerBooks come close to combining the virtues of desktop Macs with those of notebooks. They now easily attach to a color or grayscale monitor. By adding a full-size keyboard and mouse, you can create an office system equal to most Mac II's. You also have a notebook computer to take on business trips or simply to take home for the evening. And if you buy another monitor and keyboard, you can have a full-fledged system at home as well.

No, they're not perfect. The PowerBook 160 and 180 run into expansion limits if you want a 19-inch monitor or 24-bit color, or if your work requires specialized expansion boards. However, you can still get Ethernet by attaching an external SCSI device. But you have to live without massive internal hard drives, and kiss off any chance at an accelerator upgrade.

Expanding on the PowerBook Duo

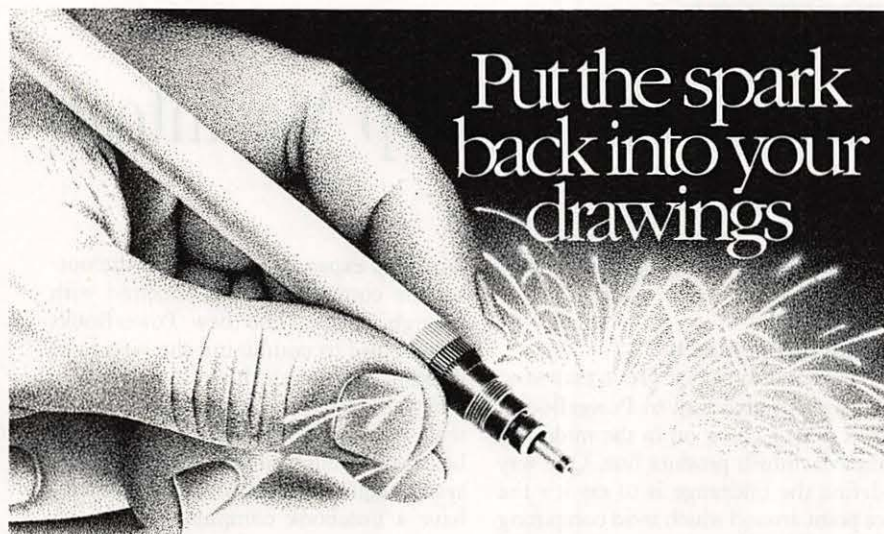
IF YOU REMAIN UNCONVINCED ABOUT replacing a desktop Mac with a PowerBook, it's probably because you need more expansion options. If so, consider the PowerBook Duos (see "Apple's Dynamic Duo" in this issue). These PowerBooks approach a desktop computer's expansion capability when you add a Duo Dock, which has two NuBus slots. The Duo Dock provides a major convenience by automatically configuring your docked PowerBook Duo with the proper system software settings, such as printer selection and screen color. This is especially important for people who plan to take the PowerBook away from the office frequently.

Remarkably, the combined price of a PowerBook Duo 210 and a Duo Dock is close to the price of a Mac IIfx with a CD ROM drive. There is even a less-expensive alternative if you don't have an immediate need for expansion slots. By purchasing a PowerBook Duo with only the Duo MiniDock, you can attach a color monitor and other options. If you leave the Duo MiniDock at the office, it

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maintains the PowerBook's physical connections to your peripherals. If you need to attach to a monitor away from the office you can always take the Duo Mini-Dock with you. And unless you carry your PowerBook to and from the office on a daily basis, you can probably live with the mild inconvenience of attaching a PowerBook Duo to the Duo MiniDock and configuring them. Later, you can add a Duo Dock if you decide that you want a 19-inch monitor, 24-bit color, or other options. This strategy will satisfy the expansion needs of most users. Of course, even the Duo Dock falls short of providing the vast expansion capability of a Quadra 950—but so do most desktop Macs.

Not for Everyone

A POWERBOOK CAN SATISFY THE TYPICAL midrange user who needs a portable but who also needs a real monitor and keyboard for extended work in the office or at home. But even so, a portable may not be for everyone. It won't satisfy users who want a second, backup computer, or who consider their office-computer use to be separate from their use of computers elsewhere. Nor will it satisfy those who want the low-cost expansion capability of a desktop and simply don't need or want a computer away from where they work (the Mac IIvx is an excellent choice for such users). Miniaturizing a fully functional computer into a laptop still costs more than making a desktop system, and until the costs become nominal, users on a budget will gravitate to the tremendous value offered by low-cost Macs like the Classic and LC. Likewise, expect users of applications such as high-end graphics to prefer industrial-strength computers such as the Quadra 950. For these reasons and others, desktop Macs won't come anywhere near extinction for some time.

Despite these limits, I wager that most midrange users want the flexibility of a notebook computer over the extra expandability of a desktop computer. I've talked to many corporate users who had already decided to purchase a first-generation PowerBook over a desktop Mac. The biggest drawback to the first-generation PowerBooks was not the absence of slots but the substandard display. Now that users can attach a color or gray-scale monitor, the decision has become much easier.

With the well-thought-out design of the new PowerBooks, a new set of pioneering users will begin to redefine the shape of the Macintosh, a shape more convenient and flexible than ever before. A shape that is truer to the original Mac concept than all preceding Macs', and that indicates the rise of the PowerBook and the decline of the desktop Mac. **m**

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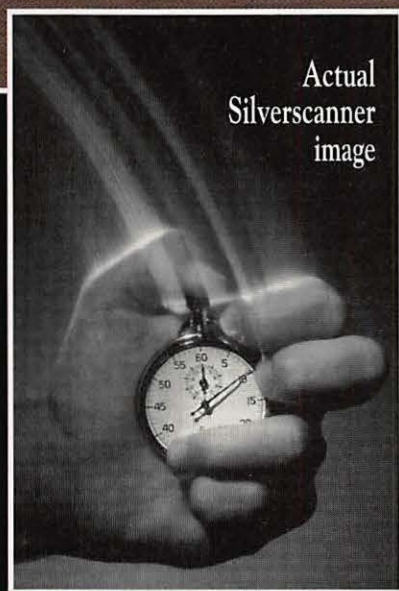
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Letters

DECEMBER 1992

Talking Back to a Mac

THE WORD *SORRY* IS AN ACT OF CIVILITY and a damn good humanizing one, be it from a human or a machine (*The Iconoclast*, September 1992). I commend Apple for having the sensitivity to remember that even though the Macintosh may be a bundle of wires and gizmos, it is ultimately a reflection of human creativity. Since we are destined to live in a modern world interacting with machines, why should we not try to humanize them as much as possible?

Chris Martell
Maui, Hawaii

STEVEN LEVY MAKES WHAT POINT exactly? That efforts to make the Mac understand our spoken commands and respond appropriately, employing conventions of polite speech, blur the line between machine and human? Rudeness is also a human trait.

I believe the fierce loyalty to the Mac that many users have developed over the years is traceable in part to the deliberate and successful effort by Jobs et al. to imbue it with something like a personality.

One of my favorite utilities is At Your Service, which uses the animated image of a pretty girl to remind me of my scheduled appointments in French-accented English. I look forward to Casper and other advances, and the more responsive my Mac becomes, the better, because it is literally my assistant.

Shelton Lankford
Clifton, Virginia

Spiffy Space Saver

THREE MEASLY LITTLE STARS FOR AutoDoubler (*Reviews*, September 1992)? Give me a break. It's the spiffiest thing since stereo! Last year I installed StuffIt, the industry standard. Not only was StuffIt incomprehensible, it was expensive. After hours of trying to figure it

out, I called Aladdin Systems. I was informed part of the program was missing but that the company would be glad to send me the update when it came out.

Meanwhile, I heard about a program that doubles everything without my having to go through the exasperating process of archiving everything; a program that, in fact, does it all automatically, and all for the measly—no, call that the chicken-feed—price of under \$50. Mama didn't raise no dummies; give me AutoDoubler anytime over that industry standard.

Jay Crosby
Fresno, California

Not Just for Grammar

YOUR REVIEW OF CORRECT GRAMMAR 3.0 asks why anyone would want to know "syllables per 100 words" (*Reviews*, August 1992). As a teacher, I find this information helpful in determining the reading level of a given 100-word passage. Since it seems Correct Grammar doesn't function well as a grammar checker, disappointed users could pass their programs on to their local schools.

Jeanmarie Wozniak
Erie, Pennsylvania

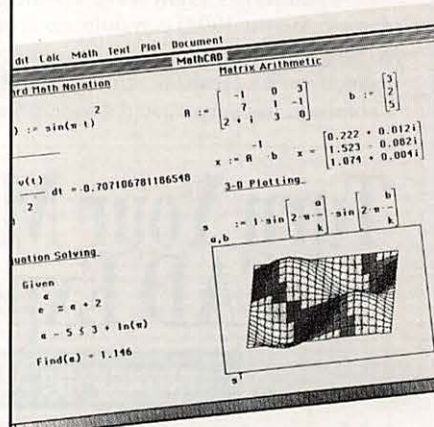
Not So Useless

IN THE DESKTOP CRITIC (SEPTEMBER 1992), David Pogue referred to the PowerBundle as "mostly useless." He neglected to mention Address Book Plus 2.0 as part of that bundle. In previous articles on contact organizers, he has given Address Book Plus a favorable review.

Steven C. Schaffer
Product Manager
Power Up Software Corporation
San Mateo, California

Mr. Schaffer is right. WriteNow (which I mentioned) and Address Book Plus (which I should have) are *continues*

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both standouts in the otherwise "mostly useless" software bundle.—David Pogue

Amiga/Mac Confusion

YOUR DECISION TO PRINT MARK Thompson's LightWave 3D image (*Letters*, August 1992) certainly attests to his skill and the potential of the products utilized in its creation. Unfortunately, Thompson has perpetuated a widespread

confusion in his characterization of these products. In this way, his criticism of your alleged omission is not truly appropriate.

He points out that NewTek's Video Toaster may be considered an Amiga product. In fact, as Thompson points out, even NewTek's stand-alone Toaster system is "an Amiga in disguise."

Despite Thompson's claim that the Toaster is an "extremely popular Mac peripheral," I don't know of any reliable data to support this. The Toaster is, was, and

likely will be for some time an expansion board and software that can only be used when installed in an Amiga's proprietary video slot. A Mac owner has several good reasons to use Amigas for video work, with or without a Toaster board. It's not necessary to camouflage the machine in a silly effort to transform it into some sort of Macintosh peripheral.

*Christopher Kobler
Collingswood, New Jersey*

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Unanswered PCPC Calls

I FOUND YOUR RATING OF PCPC'S technical support in the "Low-Capacity Hard Drives" article amusing (August 1992). You rated it "very good," yet the company returned only one of your three calls. You list its repair turnaround time as 5 days. My experience with PCPC has been worse than dismal.

My husband gave me a 45MB Mac-Bottom hard drive for Christmas 1990. Before November 1991, it died. On November 12, 1991, it was mailed to PCPC for repair and I was told that the turnaround time would be 90 to 120 days, not 5 as was stated in your article. As of today, August 5, 1992, I still do not have my hard drive nor the assurance that I will ever get it back! Nor do I even have the courtesy of a response to phone calls and letters.

*Sandy Lavin
Vermillion, South Dakota*

According to Edward Cheffetz, PCPC president, after relocating to Connecticut, PCPC is catching up on returning customers' phone calls and completing repairs. As of October 1, 1992, Lavin had still not heard from PCPC. Readers can call PCPC directly at 800/622-2888.—Ed.

CORRECTIONS

The correct phone number for Security Concepts is 310/576-6279 (Where to Buy, September 1992).

In the upper left hand photo on page 224, the Tennessee student is using a TI 99/4A with a Zenith CRT connected to a VCR ("Separate Realities," September 1992).

Educational Multimedia Concepts' product is called MacPresents Multimedia Presentation Manager (New Products, September 1992).

The telephone number for Nikon Electronic Imaging is 516/547-4355 (MacBulletin, October 1992).

The correct number for applying for the DSSO program is 800/767-2775 (Quick Tips, October 1992).

LETTERS ON COMPUTERS AND EDUCATION

Our September 1992 special issue focusing on the use of computers in education generated a record response from readers. Here are your opinions and comments on the subject.—Ed.

I AM A JUNIOR IN HIGH SCHOOL, and your article hit home with unbelievable accuracy. I previously had the privilege of attending a school in Illinois that had been the home of Apple's many pilot programs. But after I moved to Ohio, I found out what the real America was like, and it disgusts me. Our school spends millions on computers, yet doesn't offer even one computer class! Pouring money into the problem won't help. The people in charge need to understand what they are teaching.

Peter Bierman
Worthington, Ohio

AS A STUDENT IN A PUBLIC HIGH school, I am more than aware of the lack of available computer systems. I go to one of the better schools in the city, and there is one coveted Macintosh for all 1200 students. It's a shame that in Memphis we're paying our new superintendent of schools \$140,000 per year

but we can't get a decent computer lab in any school.

In about 20 years, we could see a textbook example of social Darwinism, as the other countries of the world surpass America in economic growth. Let's hope that when those countries get as fat and bloated as we are, they treat their children with a little more regard for the future.

Jay Higginbotham
Memphis, Tennessee

I APPLAUD YOUR COVER ARTICLE ON the tragedy of America's lackluster investment in education. Our voting public, in the end, seems concerned only about their own pocketbooks, even if it means stealing the future from our own children. Just as our parents' generation is willing to watch the bankruptcy of the Social Security system, this generation seems happy to ignore the plight of the schools. That a computer maga-

zine could produce a cover story more newsworthy than the average *Time* or *Newsweek* is a special and brave step.

Mark Cohen
Somerville, Massachusetts

I AM PERSONALLY DISGUSTED WITH your one-sided approach. Yes, the problems are related to partisanship, but we are still a leading hegemonic power. You cite France and Japan as success stories, but socialism is not without fault, and even Japan is having a shift in ideology with respect to the work ethic amongst its younger generation. If you think America is so bad, why are you still here?

Now that you have joined the ranks of *Time*, *Newsweek*, and the like in your liberal focus on politics, I am canceling my subscription.

Philip S. Wolff
Madison, Wisconsin

continues

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EDUCATION (CONTINUED)

ALLOW ME TO EXPRESS MY EXTREME disinterest in your September cover story as well as all of the other social commentaries that have been appearing in your magazine with depressing frequency lately. It is as inappropriate for *Macworld* to expound on the great social dilemmas of our time as it is for the *Village Voice* to debate the merits of PostScript versus TrueType. Please leave your political opinions out. As the presidential elections of 1968, 1972, 1980, 1984, and 1988 have clearly shown, the great majority of Americans are not really interested in leftist social opinions.

*Todd Breed
Seabrook, Texas*

THE PROBLEM IS NOT LACK OF money, it is lack of will. We have become so self-indulgent, individually and collectively, that we can only think of our own comfort, pleasure, and ease.

*Andy Smith
Custer, South Dakota*

CONGRATULATIONS ON YOUR gutsy assessment of computers and technology within the education system. Fortunately, my two small children are drawn to the Mac like a magnet. They are lucky; they won't need to wait on misguided bureaucrats to bring school computers up to the standards currently enjoyed by Japan, France, and Germany. But I fear that we Mac mommies and daddies are the exception rather than the rule.

*Will Cate
Mountain Park, Georgia*

IN A UNITED STATES WHERE THE rate of infant mortality is high, I would buy pre- and postnatal care before computers. In an America where preschool children face daily neglect, I would buy day care before computers. In a country where the number of children in classrooms is high, I would hire more teachers before buying computers. Where the number of people who cannot add, cannot read, and cannot write is high, I would teach the usefulness of arithmetic, the joy of reading, and the power of writing before teaching any aspect of computer usage.

Those who are now disenfranchised will become less empowered as our society becomes more technological. But technology did not cause the

current problems in education and, although computers may play a role, personal computers cannot solve illiteracy or innumeracy.

*Jeremy Reilly
Landsdowne, Pennsylvania*

YOUR PIECES ON COMPUTER EDUCATION were a shocking display of statist ideology. The premise of government running schools was never challenged. I am an educator, and I fundamentally oppose the federal government's involvement in education. That involvement has produced results such as those in banking, with the savings and loan debacle; the food industry, spending over \$20 million in order to keep prices of food high; and transportation—that is, there is no city in the United States with a subway system even close to that of Singapore. The federal legislators, bureaucrats, and administrators know nothing about education. Get them out of my way, so that I can finally do my job.

*Krzysztof Ostaszewski
Associate Professor of Mathematics
University of Louisville
Louisville, Kentucky*

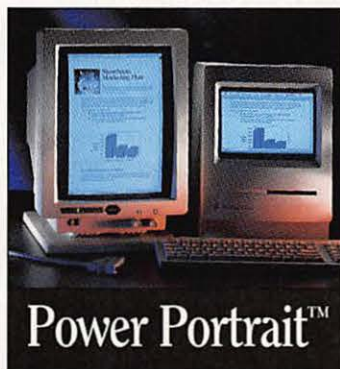
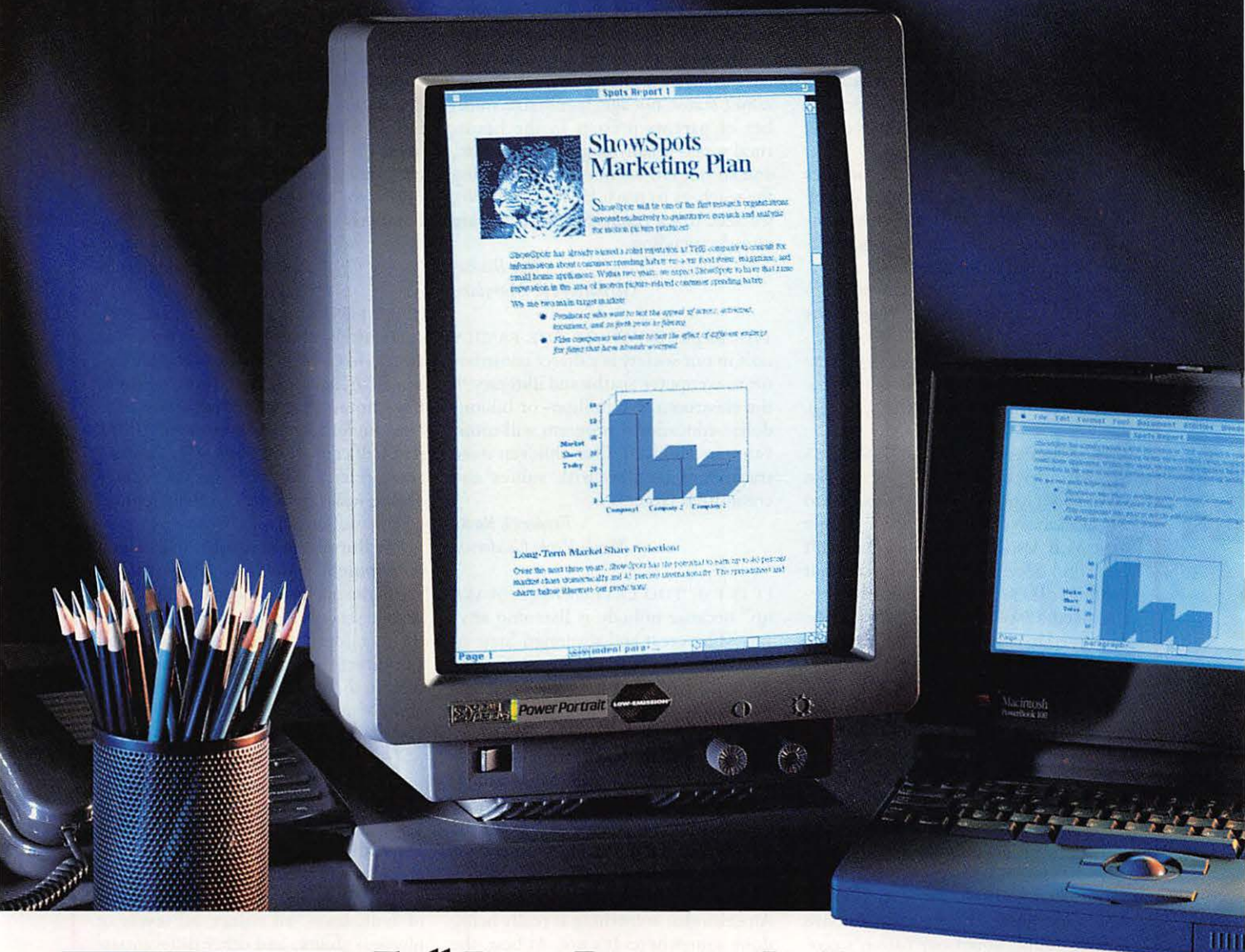
I AM A COMPUTER-SCIENCE TEACHER in a rural school system, so I can attest to the accuracy of your report. We have too few working computers, a poor selection of software, inadequate teacher training, and very little integration of technology into the curriculum. And while a panel of teachers and community and business leaders prepared a five-year plan that would integrate technology throughout the school system, we have neither the resources nor the political will to implement it. If that isn't bad enough, we are better off than every other school system in the county.

Unless this November brings a major miracle, our federal government isn't going to provide much help to public education. The only real answer is for every person of every community to become involved in the system. Let's make community action "the next thing."

*David Binnion
Hillsboro, Ohio*

IT IS DISHEARTENING TO READ that many schools actually have usable
continues

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EDUCATION (CONTINUED)

computers, but because of lack of budget to set them up and maintain them, they go unused. I guess that kind of hit home the hardest, because that one problem is well within my capabilities to fix. I have the skills necessary to help. Support groups exist. The need is there. Now I have to do it.

I was surprised that the articles didn't mention CompuMentor or any of the other groups that match computer-literate volunteers to organizations that need computer help.

Steve Stroh
Woodinville, Washington

Readers can check their telephone directories for the local CompuMentor office or call CompuMentor in San Francisco at 800/659-3579.—Ed.

THE SHAME OF YOUR ISSUE IS that it perpetuates the American myth about a good education leading to a good job. Nonsense. Today, people with M.B.A.s, Ph.D.s, and J.D.s can't even find decent jobs, with or without computer literacy. Does every child really need 12 years of education to be employed in construction, banking, insurance, gardening, sales, and scores of other service and clerical jobs? Of course not. Previous generations got along just fine with a sixth-grade education or less. As for "computer literacy," most people can maneuver around a Macintosh in just a few hours.

Paul Allen Boswell
Richmond, California

THE WHOLE EDUCATIONAL SYSTEM is so underfunded that we should have serious doubts about our nation's economic survival. We treat our prisoners better than we treat the students in some of our schools. Those students are forced through school systems that leave them bitter, angry, and uneducated. Small wonder that those students become counterproductive forces in our society.

Ernest Kimme
Vacaville, California

THE UNITED STATES SPENDS MORE per student than do the countries you laud in your articles. Yet you repeatedly point to Washington for more funds for support or training or research. But our public schools cannot even teach the basics of reading and math. Seven hundred thousand high school seniors

graduated this year as functional illiterates. Dennis Hogenon in *Reading Failure and Juvenile Delinquency* has identified that only reading failure relates to juvenile crime, not race or economic status, not age, family size, number of parents present in the home, rural versus urban, religious preference, and so on. Do we need more training for teachers to teach kids to read? No, we need to see results from what we are already spending.

Roy Blocher
Germantown, Maryland

THE BREAKDOWN OF THE FAMILY unit in our society is a direct contributor to computer apathy and illiteracy in the classroom. No million- or billion-dollar educational program will motivate our children. Our children need traditional families with values and committed fathers.

Frederick Rusko
Menlo Park, California

IT IS FAR TOO LATE TO SAY "WAKE up" because nobody is listening anyway. The great and sovereign State of Illinois has made its choice, and public education is not it. Education deals with a lag time of roughly 13 years: anything you do now at the kindergarten level will not be effectively felt until that person has graduated and is making his or her way in the world.

All the manufacturers' and the "schools of the future" programs do is provide plenty of grist for the six o'clock news, to convince Mr. and Mrs. America that something is really being done somewhere. It's not. At best, the present system is creating a tiny, privileged minority of students who happen to live in Park Forest, Illinois, a Chicago suburb where teachers are paid \$60,000 a year and can do anything they can reasonably imagine. At the other end of the spectrum are districts like Beardstown or East Saint Louis, Illinois, which might as well be on the dark side of the moon from Park Forest. In between are the majority of school districts, like ours, muddling along with some computers, but with few trained in their use.

John Avelis, Jr.
White Heath, Illinois

OUR KIDS WILL NOT LEARN EFFECTIVE technological skills until state and

national policy makers transform national priorities toward education. In order for our kids to learn the computer skills needed for survival in the twenty-first century, schools require computers and teachers require training, all of which translates into money. Won't it be nice when schools have all the money they need and the Air Force needs to hold a bake sale to buy a bomber?

Sheldon Smith
San Luis Obispo, California

JERRY BORRELL'S COMMENTARY WAS particularly objectionable because his attack on George Bush was overtly political. A balanced perspective would have noted that the inner cities have been under Democratic control for the past half century and they have deteriorated relentlessly during that time as middle-class families fled their schools by the millions.

If Borrell must involve the federal government somehow, let him do it through vouchers good at all public and private schools so the families who want their children educated in technology can direct their money to schools that offer it, thereby retaining the same principle of subsidiarity that drove the development of the personal computer.

Martin Barrack
Burke, Virginia

YOU ARE ABSOLUTELY ON TARGET with your commentary about the creation of an educational underclass. This underclass will include persons of both sexes, all colors, all levels of physical ability, and other differentiating characteristics.

There are an estimated 37 million Americans who lack even basic health insurance. If they can't buy insurance (in Maryland, about \$1500 per person per year), where do pie-in-the-sky prognosticators expect the money to come from to provide computers at home so that members of the computerless underclass can practice for themselves?

Thomas K. Lindsey
Arlington, Texas

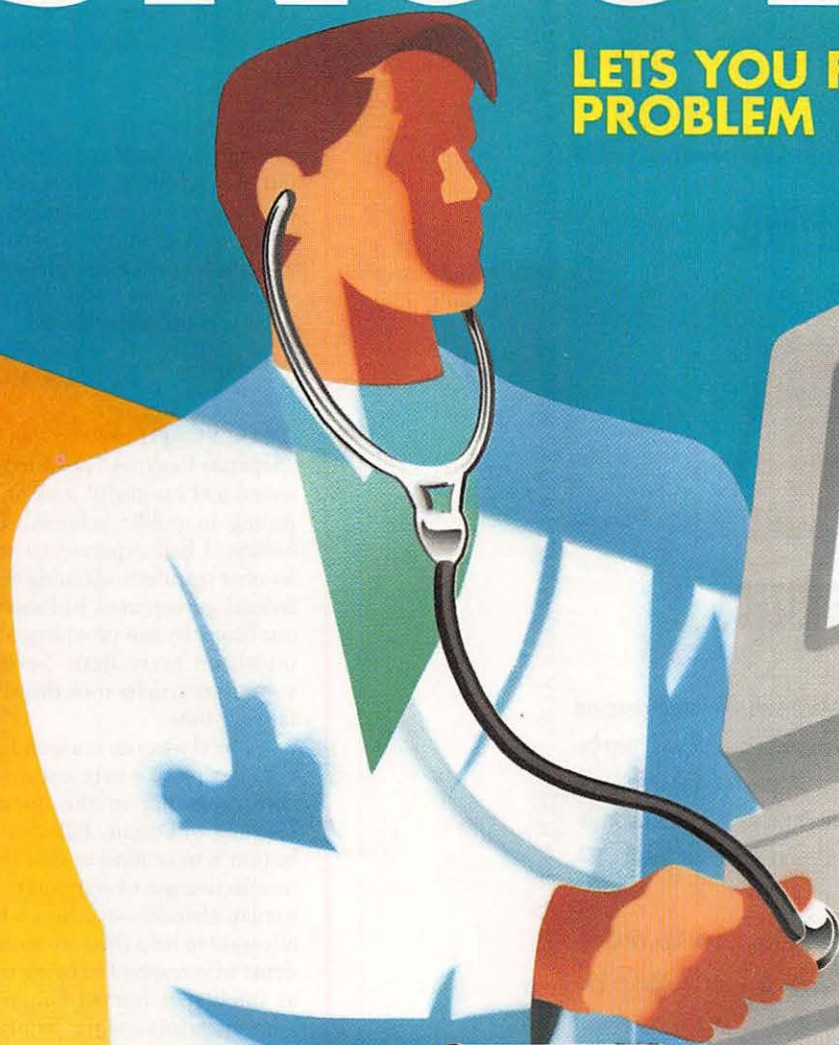
IF I WANT A POLITICAL MAGAZINE, I will purchase one. You have betrayed your readership by meddling in affairs that are out of order for a computer magazine. I was especially offended by

continues

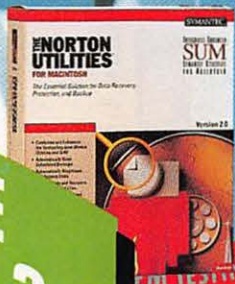
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EDUCATION (CONTINUED)

your attack on our president just in time for the election race.

*Ralph Neighbour, Jr.
Houston, Texas*

WE SIMPLY CANNOT SLEEPWALK through the social consequences of our marvelous technology. Your publication has stirred many readers to think of things we would just as soon ignore. Regardless of our views, your issue has awakened us. That is good. Many thanks.

*Joe Byers
Lansing, Michigan*

CHARLES PILLER'S ARTICLE, "Separate Realities," provided a balanced and insightful look at computing in public schools. To be honest, I had expected to see yet another manifesto claiming that the federal government had sacrificed our future by not providing a Macintosh on every desk. Several of your other articles took this all-too-familiar tone.

The classroom is a wonderfully complex place where many things come together in the hope that learning will occur. Piller's contribution is to remind us that the key to effective use of computers is the human element—teachers who really want to help their students, students who respond to being treated as intelligent human beings, and administrators more concerned with excellence than conformance.

If you want the kind of changes in education that are necessary for effective computer use, you don't have to wait for the government in Washington to do something. Schools are a local issue and they can be as good as the community wants them to be. I cut out Piller's article and sent it to my local school board. Did you do as much?

*John Boddie
Newark, Delaware*

Letters should be sent to *Letters*, Macworld, 501 Second St., San Francisco, CA 94107, or electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (Macworld), or AppleLink (Macworld1). Include return address and daytime phone number. Due to the high volume of mail received, we can't respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of Macworld. **m**

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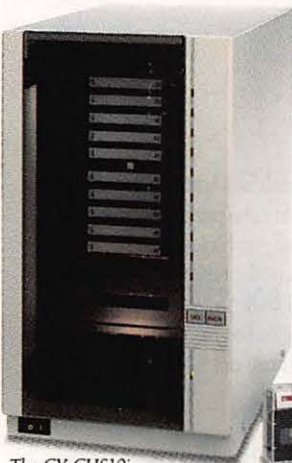
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Art Beat

Behind Macworld's Graphics

BY CATHY ABES

Artist: A professional photographer since 1969, San Francisco-based Charly Franklin decided to buy a Mac last year after discovering the wonders of Adobe Photoshop at a workshop hosted by *Photo Metro* magazine. He found that he could easily produce striking effects with Photoshop—such as compositing numerous photos into one, as he did for this assignment—that would be difficult or nearly impossible to accomplish through traditional methods. “Photoshop gives me a lot of control over my photographs,” he says. “Even if things go wrong, I have another chance to make them right. I can repair photos and do things I wouldn’t even attempt with traditional photography.”

Hardware: Mac Ilci with 20MB of RAM; Maxtor 210 internal hard drive; E-Machines TX 16-inch color monitor and 24-bit color board; SyQuest 44MB removable-cartridge drive.

Software: Adobe Photoshop 2.01.

How It Was Done: For the photograph that opens the feature “Your Computer Revealed: Expanding the System,” Franklin took a series of photographs and scanned each of them into Photoshop at 3000 dpi. He began with the two background photos: the beach and the grassy hill. After removing the people and debris from the beach, he outlined the hill (by making an alpha channel mask) and dropped it into the beach photo.

He then used the Color Balance command, from the Adjust menu, to make the grass more blue to blend with the sky. (Franklin used Color Balance, rather than Hue/Saturation, because it gave him more control over individual colors, allowing for more subtle adjustments.)

Because the composited background file was large and unwieldy, he saved just

the portion he needed to work on—the hill and a bit of the sky—to a separate file that took up a less-cumbersome 20MB. He then saved a low-resolution version of the rest of the file scaled to the size of the newly created high-res file and aligned them one over the other; by (virtually) splicing together the top and bottom portions of the background he could position the scans of various hardware devices in relation to the complete image while actually working on a smaller file.



The final composite photograph that appears on page 232.

Franklin shot three photos of each piece of hardware—at different angles and distances. The first shot was taken at about 6 feet away, the second at 8 feet, and the third shot at 10 feet. He made sure to photograph each piece in front of the background it would be placed against in the final

image: the larger images against the grass, the smaller images against the sky. After scanning these images, he reduced them to the appropriate sizes, then outlined each one with a 1-pixel feather to make an alpha channel mask, and dropped them one by one into position against the background. He used the blur tool to soften the edges around each piece of hardware and blend them into the background.

Because of time constraints, Franklin was forced to shoot the Logitech ScanMan hand scanner in his studio. Consequently, in the original photo and scan, the scanner’s viewing window appeared solid black, reflecting no sky or clouds. To make it look as if it had been photographed outside, like all the other hardware, he copied the reflection on the screen from the LCD projection panel, flipped it, stretched it, and pasted it onto the ScanMan’s viewer window. He then heightened the contrast a bit so the reflection

continues



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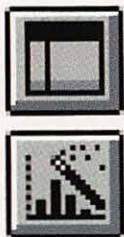
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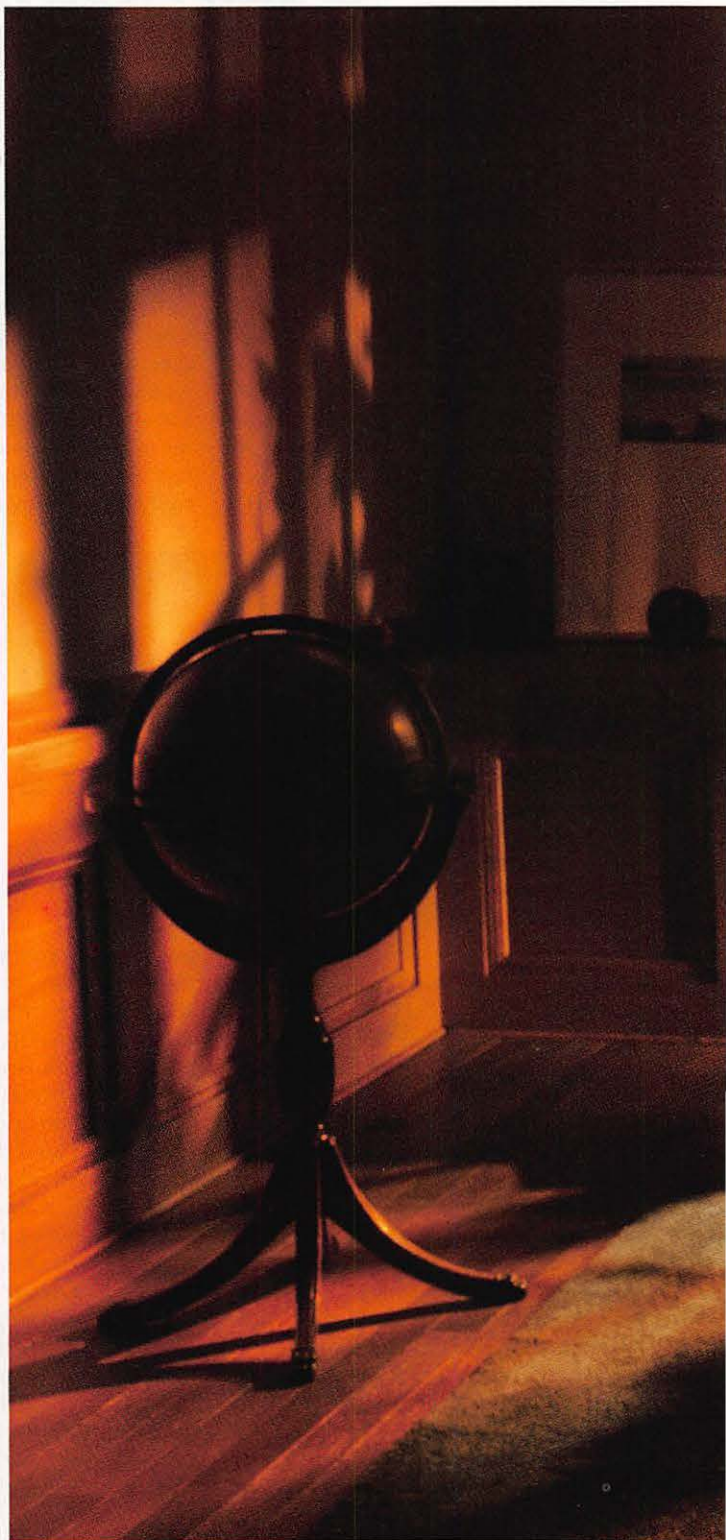
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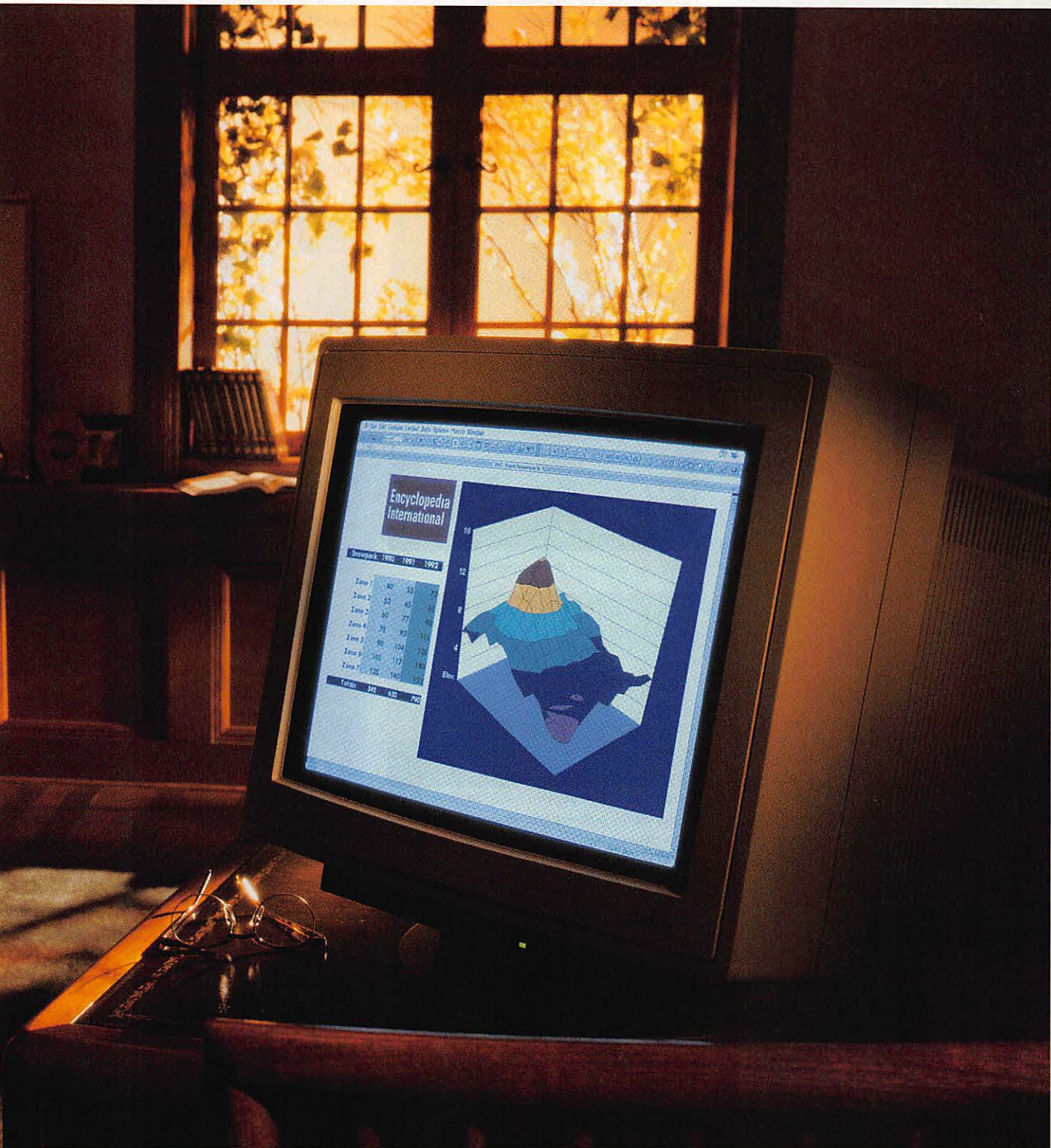
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tion would look slightly different from the original. He also pasted a small piece of the same reflection onto the smaller Scan-Man in the distance.

Franklin was able to photograph all the hardware pieces—except the SyQuest removable-cartridge drive—on stands, which could easily be masked out in Photoshop. The SyQuest had to be held up by hand. To obliterate the part of the hand overlapping the drive, he copied several small sections of the drive and pasted them successively over the hand. (He used several small pieces rather than one large piece to get a more varied, and therefore more natural, texture and color.)

Franklin used two different tech-

niques for the shadows. For the tiny ones in the distance, he drew simple shapes and filled them with black at 50 percent opacity using an 8-pixel feather. Franklin knew this process would work fine in the background where the grass looks like a green blur, but not in the foreground, where individual blades of grass are easily discernible. So for the four foreground shadows, he used the actual scanned-in shadows, outlining each one and dropping it into the background, where he made various slight adjustments—to color, shape, brightness, contrast, and size.

The final file size was 33.5MB; the photo-manipulation process, excluding photography, took roughly 20 hours. **m**



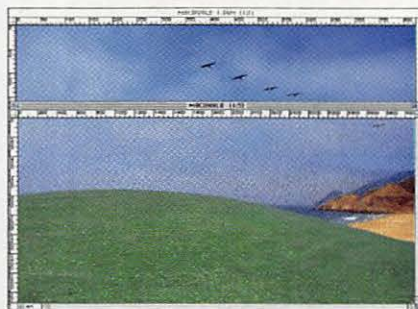
The original scan of the beach and sky photo.



A cropped version of the scanned hill photo.



Franklin combined the two background images in Photoshop by outlining the hill and saving it in an alpha channel, then placing it over the beach image.



To create a smaller working file, Franklin saved the lower two-thirds of the background as a separate file and placed it just below a scaled-to-size low-resolution version of the top portion (which Franklin used for positioning).



Because the hand scanner was shot in the photographer's studio and not outdoors as the other peripherals had been, its viewer window appeared solid black; to simulate the reflectivity of sky and clouds an outdoor shot would have captured, Franklin copied the reflective screen from the LCD projection panel and pasted it over the viewer window.



While all the other hardware peripherals were photographed on stands (which were then easily masked out in Photoshop), the SyQuest drive had to be held up by hand.

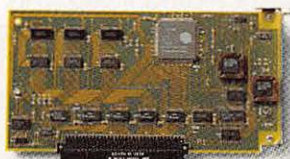


Franklin obliterated the hand by successively pasting small pieces of the drive over it.

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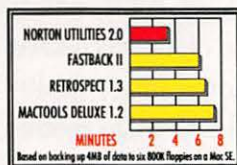
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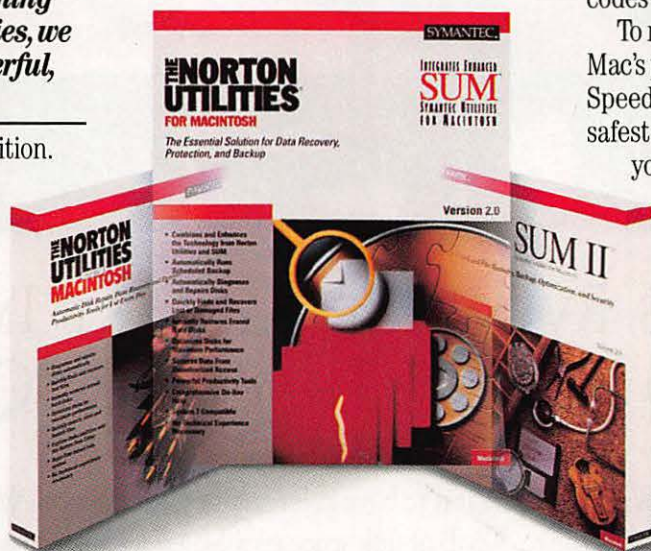


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Trouble in Finder City

BY STEVEN LEVY

REMEMBER THE GOOD OLD days. We would sit on the porch swing, drink fresh lemonade or cheap bourbon (none of those wine coolers!), and talk about Harry Truman. Every so often a DOS guy would walk by the house. You could tell those DOS guys by their suits.

When a DOS guy went by, Ma and Junior and I would get off the porch swing, lean over the railing, and razz the heck out of the poor bastard. "Yo DOS guy!" we'd yell. "How's your interface these days? Still using that *consultant*?"

You see, back in the old days—I'm talking mid-eighties, when you could just look at a fellow's computer and know what he was made of—those DOS guys all had consultants. Had to. The only folks who could get to first base with DOS were wireheads and bureaucrats. You just about needed a soldering iron to copy a file. That's where the consultants came in. You'd hire one of these dweebs to take the one or two applications you used—your spreadsheet and word processor, probably—and he'd write something that let you sit at your computer and get you right there, without dealing with DOS at all. First thing you'd see when you sat down was a little menu that let you copy a file, or rename one, or go straight to WordStar or Lotus. The thing was called a shell.

We thought it was a hoot. We were Mac guys. We had the Finder, written for real people. All you had to do was wave the mouse around and point to a picture on the screen and what you wanted to do, got done. Didn't need a *shell* to protect us. Who'd want a computer operating system that you needed to be protected from? DOS guys, that's who. So when they passed by, we'd hoot at them. "Shells!" we'd howl. "Shells!" And they'd turn all sorts of colors and hunch their heads down into their padded suit-shoulders. They were mortified, just like they should have been. Wouldn't know user friendly if it chewed their leg off. Not without a shell.

Those days were something. Not like today. You'd never say today was something. A lady at the user group last week put her finger on it, "There's trouble in Finder City," she said. A vein just about

popped out of her neck as she said it. Lady had a point. Trouble in Finder City.

It's been bothering me for quite a time, but I didn't want to come out and say it. Didn't want to give the DOS guys the satisfaction. But now I can't avoid it. Last summer I packed Ma and Junior in the three-quarter-ton and we headed to the Macworld Expo. And what was Apple showing at its booth? A new program called At Ease. You install it in your Mac and instead of seeing the desktop you get these pumped-up icons representing your applications and documents. To open 'em you click on 'em—not a good old-fashioned double-click, but a fancy-pants single-click. (What ever happened to old-time religion?) You can't rename files, or toss 'em in the Trash Can. You can't do much of anything, and you know why? It's a shell. A shell for the Finder!

Used to be that when everything else went to hell, you could depend on the Finder desktop. Now we need to be protected from it, like it's some sort of disease. Like it was *DOS*. As soon as I saw those Apple-oids at the booth single-clicking with At Ease, I had to throw my lot in with the user group lady. There's trouble in Finder City. With a capital *T*.

Birth of the Finder

I DON'T KNOW IF YOU CAN REALLY blame Apple for it. We all know the Mac's been shooting up like corn in August—more power, more disk space, more everything. Because of that, the Finder hasn't been itself for quite a while. Back when those young Apple-heads first whipped up the Mac—1984, when John Sculley had barely stopped peddling sugar water—the machine had but 128 kilobytes of memory, and hard drives were the kind of thing you'd see on "Star Trek." It didn't matter that pointing and clicking from one folder to the next couldn't move you too fast, because there was nowhere to go, really. But then Macs got more memory, and hard drives came, and got bigger and bigger and bigger. It became harder and harder to get around on the darned

thing. And if you weren't careful, all the files you made would pile up, or find themselves in strange folders, or somehow get misplaced, and soon Finder-cleaning became a regular chore, like cleaning the closets every spring.

And besides that, people wanted more on the Finder, more bells and whistles. Crazy utilities. Alarm clocks that could go off a year from when you set them, and screen savers, and virus fighters, and scrapbooks with multiple files, and address books, and picture browsers, and macros—macros!—and even something that put a moose on your screen, a stupid-looking moose that said dumb things at prearranged intervals.

And by then we had multitasking. One application at a time was not enough for us. We wanted to do everything at once. But that just messed things up more.

Then there got to be the problem of *finding* things. (A Finder's got to find.) A graphical interface like the Finder was fine when you only had a few levels of files and folders, but when you had hundreds of files in dozens of folders, you'd go nuts trying to locate the one you wanted. You had to buy a utility to do the finding. (I always had a sweet spot for On Location.) Things got so, even when you knew where a folder was, it wasn't easy to get to it—you had to do so much pointing and clicking that you almost began to envy those DOS guys who could just type in a file name and get what they wanted.

The folks at Apple saw the trouble in Finder City, but they promised us that everything was going to be all right. They would gussy up the whole business when System 7 came out. And so they did—gave it a thorough dusting. It was a system for power users. We could stick in desk accessories without using that clunky installer. (Never took a shine to that program, anyway.) As many DAs as we wanted. And we could throw in regular apps and even documents under the Apple menu. We could find things then—though the Find File command was so downright wimpy

continues



*With
At Ease, the
Mac goes
to shell and
back*

that you still needed your utilities. But this new Finder had the Alias function, which let you clutter up your desktop with copies of copies of copies so you would never be too far from a file you really needed.

7's Deadly Sins

YEAH, THE SYSTEM 7 NEW FINDER had lots of snappy features. But it was more complicated than anything that came before it. (I'm not even going to talk

about how much space it took up—don't get me going on that.) Consider the Trash Can. What could be simpler than a trash can to delete files? You drag a file to the Trash Can and it's gone! Well, in this new version, the trash doesn't get taken out unless you ask for it to happen. Now we hear stories all the time of people with no room on their hard drives because they didn't know that the Trash Can kept getting stuffed bigger and bigger. They had no idea that the trashman didn't come

each time you put some refuse out. (I never had this problem, since in my town you have to haul your own garbage to the dump.) Apple told people about it, but since the System 7 manual is about the size of the Old Testament, they never got to that part!

And the trash story doesn't end there. Some slick hackers actually wound up writing utilities to manage the Trash Can. You can have the trash go out by the kind of file it is, or how long it's been drawing binary maggots in your Trash Can icon. Can you believe it? A utility for your trash can!

Me, I still keep coming across things in the System 7 Finder that jack up my blood pressure. What drove me nuts for months was this problem I had saving files. I'd press the command for save, and then the dialog box wanted to know what folder I wanted the file to live in. So I'd navigate to the folder I wanted, like I was playing some adventure game like an overheated 15-year-old. (Junior has a fondness for D & D.) When I was finally ready to save, I'd try typing in the name of the file—but the Mac would think that I was still looking to find a folder, and would read my typing as if I were locating a file. I had to reach the mouse, move the cursor to the file-naming line, and then click. (Finally, while talking to one of the folks working at Apple, I learned that hitting the tab key would do the same thing—I guess if I'd have read that slick, Bible-size manual I would have figured it out myself.)

And then there's this business of INITs. Every time I turn the machine on, a row of them flashes on the bottom of the screen, sporting their icons like billboards off the interstate. Half of the icons I don't even recognize. But I know they're in there—almost every time I try a new program, I get a darned bomb box on my Mac, and have to relaunch the program with all the INITs turned off. And of course there are utilities to solve *that* problem, too, with names like Conflict Catcher. Why didn't Apple catch the idea that all these INITs were going to have these conflicts? It breaks my heart to think about those INITs, shoehorned into RAM like cats in the same alley, squirting memory blocks to mark territory and scratching each other's eyes out when one dares cross another's line.

Ease-y Does It

SO WHILE THE FINDER IMPROVED, IT got more and more tangled. No one's more of a Mac guy than I am, but I admit to some bad moments last year when I brought in some folks to see the pride of

continues

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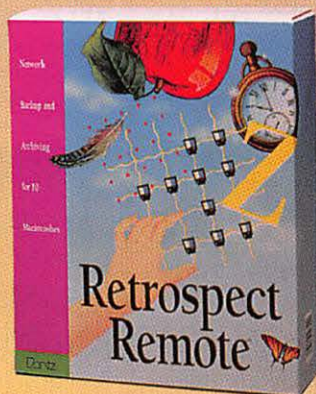
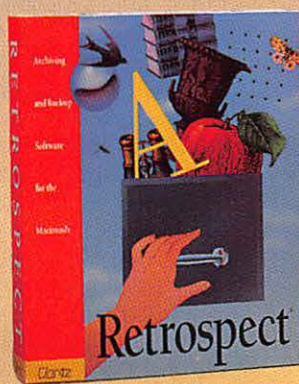
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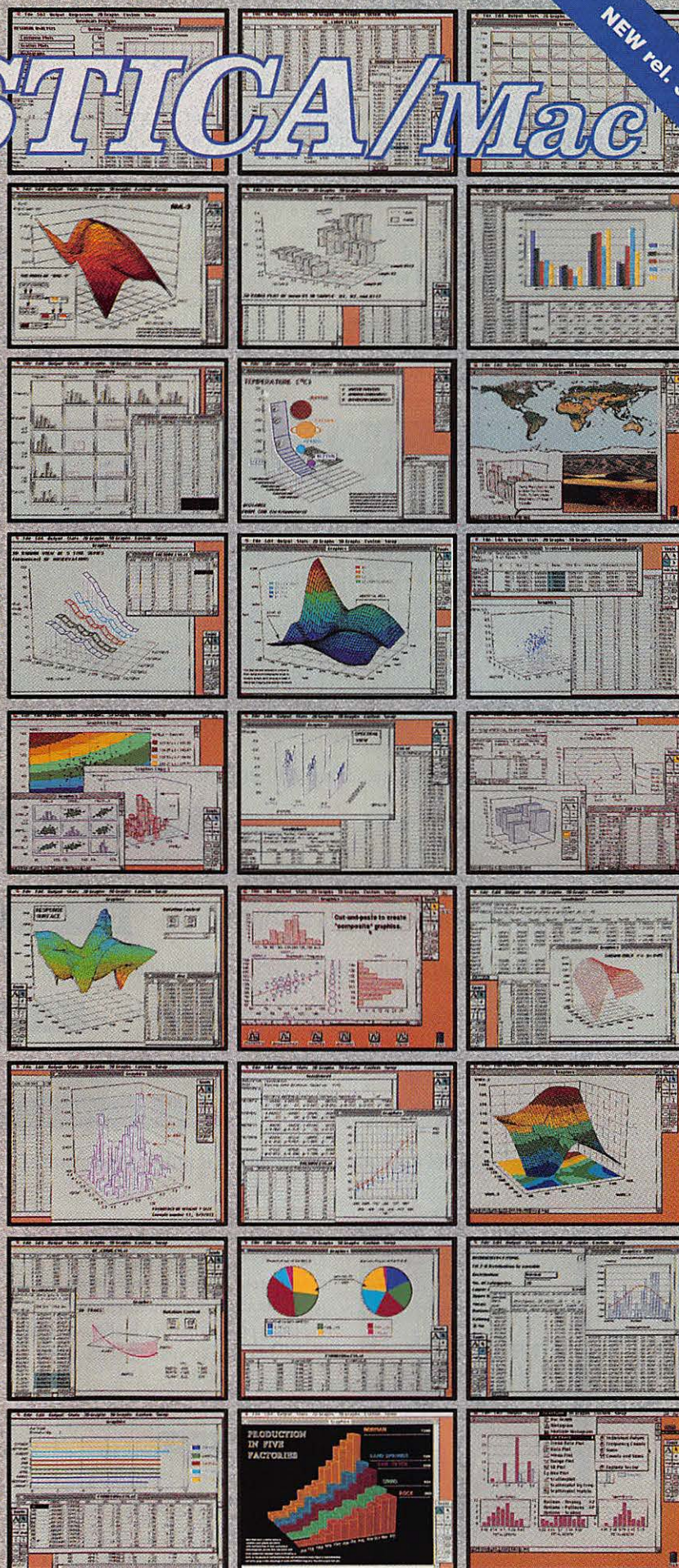
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my desktop. These folks were green, never touched a computer, and I thought I would show them how simple my Mac is to use. I flicked it on, and began explaining, but by the time I got to the INITs and control panels and aliases and hierarchical levels, they began looking at me like I was some beetle-headed technoweenie. Like a DOS guy!

I guess it's no wonder that Apple finally came out with a shell. Still, it breaks my heart. Not long after that Expo, I

called on a nice fellow at Apple named Dave Pakman, the product manager for At Ease. When speaking of At Ease, he didn't use the word *shell*, of course. "It's a friendly desktop that replaces the Finder," he said. "It's directed to the home and education market and for people new to the Mac. It helps ensure success for novice users."

"Are you saying, Dave, that the Finder isn't friendly?" (He's a nice fellow, but I couldn't help but rub it in.)

"I try to use the word *friendlier*," Pakman said. Then he went on about how great At Ease would be when you had other folks using your system—vandalistic students or playful kids or virgin Mac users who just didn't know what the hell they were doing—and you didn't want your files in the wrong places or renamed or trashed. And I guess that At Ease does the trick for them.

I also think that for someone who has never used a Macintosh, At Ease might help them get going a bit quicker. Though when I finally got a copy of the program myself (just to experiment with, mind you—you'll never see the thing on *my* machine), I came to think that a Mac beginner might do well not to go near At Ease. It's like training wheels—get used to

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*Used to be that
when everything else went
to hell, you could depend
on the Finder desktop. Now
we need to be protected
from it, like it's some sort
of disease.*

them and it'll take you a longer time to learn to ride the bike. Sooner or later, you've got to skin your knee!

And if you use At Ease you might get the boneheaded idea that you open files by single-clicking. This is not what God, or Steve Jobs, intended.

What it boils down to is this. We ask the Finder to do a lot for us—too damned much—and to be simple, to boot. Maybe that's asking too much. Maybe the only way around it is to buy lots of utilities, or fool around in shells, or even read those bozo manuals. Or even hire a consultant! Whatever—the situation is a sorry shame, and I'm not going back out on the porch again until the matter is resolved. I'm sick of those DOS guys laughing at me. **m**

STEVEN LEVY's most recent book is *Artificial Life* (Pantheon, 1992).

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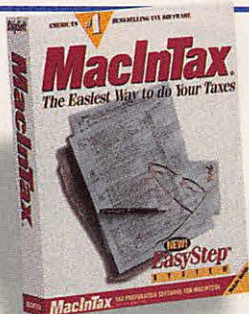
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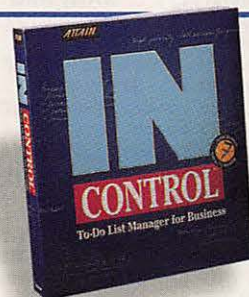
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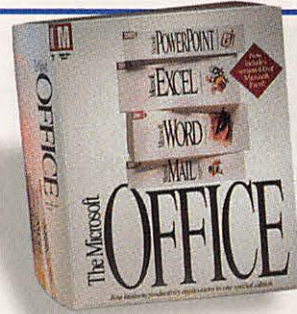
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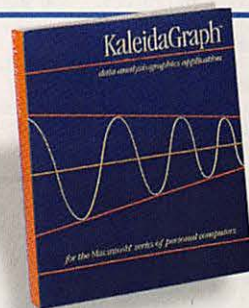
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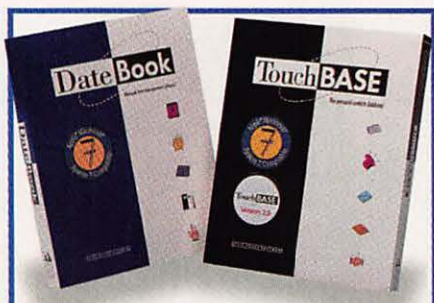
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4709 **LetraStudio 139.** 6300 **FontStudio 359.**
Light Source
3733 **Ofoto 1.1.1** 275.
Linguist's Software ... 60 day MBG
Over 100 language fonts call
Macromedia
7651 **Action! Mac (Oct. '92)** 349.
7441 **SwivelPro 479.** 3450 **SwivelMan 619.**
7653 **MacroModel** 999.
Manhattan Graphics
4990 **Ready, Set, Go! 5.14** 219.
MicroMaps ... 30 day MBG
7556 **MapArt (PICT) or 7555 (EPS)** ea. 89.
Microsoft ... 30 day MBG
2878 **PowerPoint 3.0 (Oct. '92)** 245.
Postcraft International
2210 **Effects Specialist 1.04** 89.
Quark
7612 **QuarkXPress 3.1** 549.



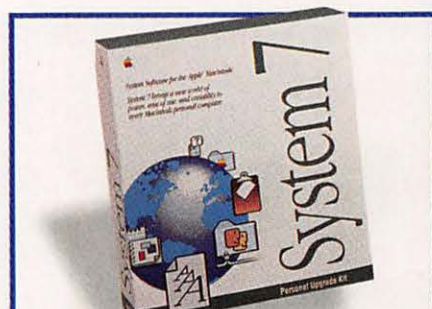
Dove Computer ... 30 day MBG

9634 **DoveFax+V**—Fax, data, and voice communications on the World Class Award-winning DoveFax. 96/24 bps Fax/Modem plus personalized voice mail system \$265.

- Specular International ... 30 day MBG**
4962 **Infini-D 2.0** 699.
Terrace Software
9970 **Mum's The Word Plus (gardening)** ... 107.
Timeworks ... 30 day MBG
7115 **Publish It! Easy 3.0** 109.
7409 **ColorIt! 2.0** special 129.
T/Maker ... 30 day MBG
8286 **ClickArt (bitmapped) 38.** or (EPS) 82.
Virtus Corporation ... 30 day MBG
4488 **WalkThrough 1.1** 309.

PROGRAMMING UTILITIES, HYPERCARD, SECURITY

- Abbott Systems ... 30 day MBG**
2515 **Calc+ 1.0 39.** 5236 **CanOpener 2.0 59.**
Aladdin Systems ... 30 day MBG
7410 **StuffIt Space Saver 1.0** 34.
6740 **StuffIt Deluxe 3.0** 65.
Aldus ... 30 day MBG
5100 **SuperCard 1.6** 195.
ALSoft ... 30 day MBG
9808 **MasterJuggler 1.58** 25.
9807 **DiskExpress II 2.11** 48.
5204 **ALSoft Power Utilities 1.0.2** 62.

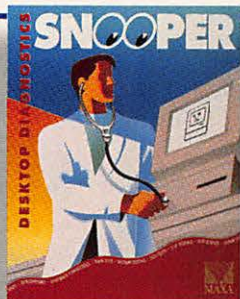


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1074 **System 7**—Add powerful new capabilities like Publish and Subscribe, MultiTasking, Balloon Help, Virtual Memory, and more to your existing System. Includes free ATM disk, 4 fonts, & video \$79.

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Apple Computer
1206 **At Ease 1.0** 49.
1074 **System 7 (w/free ATM & video)** 79.
3413 **System 7 Group Upgrade Kit** 249.
7072 **QuickTime Starter Kit** 149.
ASD Software ... 30 day MBG
7085 **FileGuard 2.7 (1 user)** 138.
Baseline Publishing ... 30 day MBG
7783 **INIT Manager 33.** 3114 **DiagnoSYS 39.**
Berkeley Systems ... 30 day MBG
2198 **More After Dark (M.A.D.)** 23.
5737 **After Dark 2.0V** 28.
2196 **After Dark & M.A.D. Bundle** 39.
3392 **Star Trek: The Screen Saver** 34.
Casa Blanca Works ... 30 day MBG
1593 **Drive 7 2.3** 49.
CE Software ... 60 day MBG
1727 **CalendarMaker 3.0.1** 31.
8024 **QuickKeys 2.1.2** 89.
Central Point ... 30 day MBG
5041 **Mac Tools Deluxe** 99.
Claris ... 30 day MBG
8734 **HyperCard Development Kit 2.1** 139.
Connectix ... 30 day MBG
8441 **CPU (Connectix PowerBook Utilities)** ... 49.
Coral Research
7310 **TimeLog** 62. 7309 (10 Pack) 399.
Dantz Development ... 30 day MBG
3393 **DiskFit Pro 1.0** 72.
5255 **Retrospect 147.** 7945 **Remote 1.3 264.**
7946 **Remote (10 Pak) 147.** 3112 **(50 Pak) 649.**
Fifth Generation ... 30 day MBG
4287 **PYROI 4.01 27.** 3955 **Suitcase 2.1 53.**
7704 **Public Utilities (Oct. '92)** 98.
8286 **SuperLaserPool 3.0** 99.
5178 **FastBack Plus or 5725 DiskLock** ... 125.
7404 **DiskDoublor or 4838 AutoDoublor** ea. 45.
FWB, Inc. ... 30 day MBG
7929 **Hard Disk Utilities Personal Edition** ... 49.
2999 **Hard Disk Toolkit 1.1.1** 125.
ICOM Simulations
6296 **Intermission** 29. 3731 **OnCue II** 55.
Inline Design ... 30 day MBG
1744 **Icon 7** 31. 9843 **InSync 1.0** 79.
7068 **INITPicker 3.0 (Oct. '92)** 38.
2913 **Redux 1.63** 49. 1740 **Deluxe** 92.
Kent Marsh Ltd. ... 30 day MBG
9513 **FolderBolt 1.02** 71.
Kiwi Software ... 60 day MBG
6267 **KiwiENVELOPES! 3.1.6** 32.
Magic Software ... 30 day MBG
7267 **AutoSave II 26.** 7270 **Backmatic** 50.

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8694 **Snooper (software only)** 119.
★Microcom ... 30 day MBG
4803 **Virex/Mac..** 66. 8561 **911 Utilities**.. 99.
★MicroMat Computer Sys. ... 30 day MBG
3732 **MacEKG II 2.0** 89.
★Microspot ... 30 day MBG
8706 **MacPalette II**..... 45.
8782 **MacPlot Professional** 249.
★Nine to Five Software ... 30 day MBG
2020 **9 to 5 Office 19.** 9767 **Reports 2.5** 125.
★Now Software ... 30 day MBG
1793 **Now Up-To-Date...** 65. 2366 (10). 395.
6925 **Now Utilities 4.0**.... 95. 8471 (10). 775.
Palomar Software
8210 **PLOTTERgeist 2.1** 249.
Peripheral Land, Inc. (PLI)
7326 **Mac-to-DOS 3.0** 99.
Pluma, Inc.
8704 **Cause or 8713 Net Effect** ea. 185.



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3732 **MacEKG II 2.0**—Provides in-depth knowledge on what makes your Mac tick. Features: advanced component-level diagnostics, log & compare 178 different parameters, ability to isolate/diagnose intermittent failures..... **\$89.**

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6748 **Norton Utilities for Mac 2.0** 95.
3421 **THINK Pascal 165.** 2688 **THINK C** 199.
9957 **THINK Reference 1.0** 68.
Teknosys
5203 **HELP!** 88.
★TGS Systems ... 60 day MBG
6667 **Prograph 2.5** 299.
★Thought I Could ... 30 day MBG
4843 **Wallpaper 1.0.2** 37.
UserLand Software
4753 **Frontier 1.0** 189.
★Utilitron, Inc. ... 30 day MBG
9616 **Guaranteed Undelete w/TrashMaster** 45.

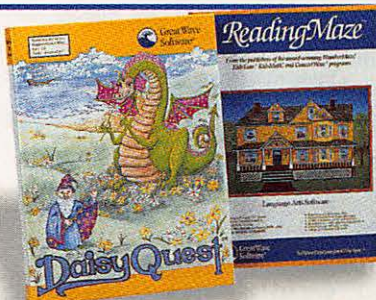
LEARN & PLAY FOREIGN LANGUAGES, TRAINING, GAMES

★Abracadata, Ltd. ... 30 day MBG
5805 **Sprout! 1.0 (veggie garden planner)**... 39.
Activision
1039 **Shanghai II** 29.
1134 **Lost Treasures of Infocom Vol. I.** 40.
2470 **Lost Treasures of Infocom Vol. II.** 29.
★AMTEX Corporation ... 30 day MBG
2517 **Tristan**..... 39.
★Baseline Publishing ... 30 day MBG
7785 **Talking Moose 4.0.2** 22.
Broderbund Software
6516 **The Playroom 2.0 (CP) (color)**..... 29.
6285 **Carmen Sandiego Series (CP)**..... ea. 29.
8285 **Where/World Carmen Sandiego Deluxe** 47.
3559 **SimAnt or 5871 SimCity Supreme**.. ea. 35.
8266 **SimEarth 1.1** 40.
1910 **SimLife**.... 41. 3307 **A-Train**.... 39.
Buena Vista Software
1711 **Heaven and Earth**..... 29.
★Centron Software ... 30 day MBG
2707 **Puzzle Master**..... 26.
5910 **Crossword Creator** 39.
8525 **Casino Master**... 39. 8524 (Color).... 45.
Colorado Spectrum
2554 **Mouse York**..... 29.
★Cyan ... 30 day MBG
6320 **Manhole 1.6**..... 19.
★Davidson & Associates ... 30 day MBG
3922 **Talking Spell It Plus**..... 29.
2574 **New MathBlaster Plus** 34.
8278 **Alge-Blast Plus** 34.
Delta Tao Software
2536 **Spaceward Ho! or 2439 Strategic Conq.** 36.
EARTHQUEST
8050 **EARTHQUEST or 3118 Ecology 1.0** 34.
Electronic Arts
5702 **4D Boxing**.... 32. 1907 **PGA Golf**.. 39.
★Expert Software ... 30 day MBG
6219 **Expert Astronomer 1.0**..... 29.
Graphic Simulations
4756 **Hellcats Over the Pacific 1.0.3** 39.
★Great Wave ... 30 day MBG
8044 **Decimal & Fraction Maze (Color)** 35.
6693 **KidsMath 2.0 or 2276 Kid's Time**.. ea. 25.
4334 **NumberMaze**.. 25. 8527 (Color) .. 35.
1513 **ReadingMaze (Color)** 35.
3471 **DaisyQuest** 35.
★HyperGlot Software ... 30 day MBG
(French, German, Italian & Spanish)
7000 **Word Torture** ea. 32. 7001 **Tense Tutor** ea. 38.
7002 **Pronunciation Tutor**
(Span., Fren.) ea. 32. (Germ., Chin.) ea. 38.



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1562 **3 in Three or 1944 Swamp Gas**.. ea. 31.
1747 **Swamp Gas Europe** 31.
8809 **Tesseract 31.** 3414 **Mutant Beach** 39.
Innerprise
1662 **CyberBlast**..... 25.
Interplay Productions
1894 **BattleChess (3D animation)**..... 29.
1893 **CheckMate (infinite play levels)**..... 31.
★Learning Company ... 30 day MBG
2670 **Reader Rabbit 3.0 (CP) (ages 4-7)**.... 34.
3687 **Super Solvers: Midnight Rescue!**..... 34.
2988 **Super Solvers: SpellBound!**..... 34.
3281 **The Writing Center 1.0** 51.
★Leister Productions ... 30 day MBG
7126 **Reunion 3.0** 115.
★MECC ... 30 day MBG
3963 **Oregon Trail 1.1**..... 28.
3960 **Number or 3959 Word Munchers**... ea. 18.
★Microsoft ... 30 day MBG
2868 **Flight Simulator 4.0 (CP)** 42.



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3471 **DaisyQuest**—Premier pre-reading learning experience that prepares a young learner thru the introduction of word sounds, for the necessary steps in learning to read **\$35.**
1513 **ReadingMaze-Color**..... **35.**

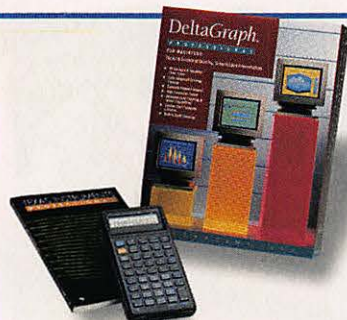
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7470 **Jungle Quest 30.** 7537 **Kolor Klips 37.**

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VocabuLearn/ce Level III (Span., Fren., Germ., Ital., Rus., & Japan.)..... ea. 35.

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Pluma, Inc.

8695 **Capitalist Pig**..... 34.

★Que Software ... 30 day MBG

9743 **Typing Tutor V**..... 29.
Sierra On-Line

2412 **Rise of the Dragon**..... 34.
3552 **Leisure Suit Larry V or 7396 Red Baron 39.**

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4489 **Galactic Frontiers**..... 38.
3472 **Family Cards (Solitaire, Rummy, War) 49.**

Software Toolworks

4619 **Mavis Beacon Typing 1.3 (CP)**..... 29.

★Spectrum Holobyte ... 30 day MBG

4835 **Tetris 1.3.** 27. 3017 **Wordtris 1.0**... 27.
3459 **Falcon 2.2.2 or 8181 Vette 1.0**... ea. 33.

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StudyWare

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LSAT Prep..... 35.

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7624 **NEMESIS Go Master 5.0**..... 38.
7623 **NEMESIS Go Master Deluxe 5.0**..... 99.

2934 **Spectre**... 34. 5280 **LAN 3-Pak**... 57.

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7013 **Voice Navigator SW w/Headset Mike**.. 325.
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8188 **MusicProse**.. 189. 5604 **Finale**.. 549.

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Macromedia

5486 **Sound Edit PRO 2.05**..... 199.
4598 **MacRecorder Sound System PRO**... 239.

5087 **MacroMind Director 3.1**..... 799.
2246 **MacroMind Three-D 2.0.2**..... 999.

4252 **NEC MultiSync 3FGx**..... \$659.

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8250 **Encore (with free Trax)**..... 379.

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1738 **Color Pivot LE**..... 899.
1736 **Precision Color Display/20S**..... 2899.

RasterOps
9784 **RasterOps 24SX 649.** 8944 **24STV**.. 819.

8039 **Paintboard Li**..... 929.
7695 **24Mx**..... 1249. 7702 **24MxTV**..... 1799.

8392 **Sweet 16 Color Monitor**..... 1249.
7699 **Sweet 16 Video System**..... 1999.

7703 **Sweet 16 Live Video System**..... 2599.

Sigma Designs
6944 **Power Portrait (platinum)**..... 769.

Software Toolworks
5201 **The Miracle (piano teacher)**..... 349.

Sound Source
9972 **Star Trek: The Logical Collection Vol. 1** 30.

9988 **Star Trek: The Final Frontier Vol. 2**..... 30.
1759 **AudioClips 2001 w/Hal the computer**.. 35.

★**SuperMac Technology ... 30 day MBG**

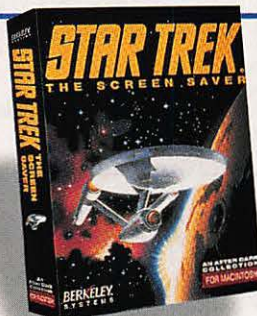
4122 **VideoSpigot LC**..... 255.
4114 **VideoSpigot IIsi**..... 339.

4164 **VideoSpigot (for NuBus)**..... 379.
7676 **VideoSpigot Pro.** 1099. 3691 **Pro si** 1099.

7679 **Spigot & Sound (NuBus)**..... 489.
7678 **Spigot & Sound Pro (NuBus)**..... 1099.

7677 **17" SuperMatch Multimode**..... 1149.
1805 **20" SuperMatch Color Display**..... 1599.

4720 **21" Platinum Two-Display**..... 1099.
2330 **Spectrum/8x24 PDQ or 2231 PDQsi** ea. 899.



★Berkeley Systems ... 30 day MBG

3392 **Star Trek: The Screen Saver**—Beam aboard the Enterprise with Captain Kirk and Mr. Spock on a mission to prevent screen burn-in. 15 animated displays, System IQ, and After Dark compatibility..... **\$34.**

CD-ROM

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3730 **Just Grandma and Me (CD-ROM)**..... 34.

CD Technology
2321 **CD-ROM Caddy**... 11. 2533 **(5 Pack)** 49.

8057 **Porta Drive CD-ROM**..... 579.
Creative Multimedia Corp.

1874 **Mammals of North America**..... 29.
8739 **Beyond the Wall of Stars**..... 40.

8744 **Total Baseball 40.** 2484 **Family Doctor 45.**

★**Cyan ... 30 day MBG**
1343 **Manhole (CD-ROM)**..... 23.

2717 **Cosmic Osmo 1.1 (CD-ROM)**..... 37.

★**Ergonomic Software ... 30 day MBG**
7056 **Panoramix Vol. 1 (CD-ROM)**..... 69.

★**Highlighted Data ... 30 day MBG**
7771 **Webster's Dictionary (CD-ROM)**..... 159.
6968 **Footage '91 (CD-ROM)**..... 159.



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2707 **Puzzle Master**—Solve 250 New York Times crossword puzzles on your Mac. **\$26.**
5910 **Crossword Creator**—Create your own puzzles from a word list..... **39.**

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Berlitz Think & Talk (CD-ROM).. ea. 125.

ICOM Simulations

3717 **Sherlock Holmes, Consulting Detective** 38.
Interplay Productions

7111 **Battlechess**..... 45.

★**METATEC/Discovery Sys. ... 60 day MBG**
6823 **Best of MIDI Connection**..... 32.

3683 **Backpac 1, 3679 2, or 2176 3** ea. 45.

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Image Series Vol. 1-4 (Russia/China, Tropics, Parades, Ancient Egypt).. ea. 105.

7313 **Sound Series V.1-Music for Multimedia** 105.
7312 **Educ. Series V.1-Animated Relativity** 105.

NEC
6577 **CDR-37 CD-ROM Portable Drive**..... 389.

6826 **General Reference CD-ROM Bundle** 439.
6582 **CDR-74 CD-ROM Drive**..... 629.

Software Toolworks
4836 **World Atlas 45.** 4397 **Time Table of Hist.** 49.

3915 **Grolier Encyclopedia (CD-ROM)**..... 249.

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Apple Computer

7073 **Mac PC Exchg.** 69. 7102 **AppleShare** 969.
7101 **AppleTalk Remote Access**..... 159.



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2479	3.5" Floptical Drive..... 479.
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1739	3MC3NB (Mac II Ethernet card)..... 189.
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*Dayna ... 60 day MBG	
8722	DaynaFile II 1.2 5 1/4" Drive..... 429.

*DayStar Digital ... 30 day MBG	
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3584	DualPort IIs with 20 MHz 68882..... 165.
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8556	FastCache for Mac IIci..... 223.
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8785	FastCache 040 (for Quadra)..... 409.
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3401	FastCache IIs 299. 3389 w/FPU... 369.
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40 MHz	819. 50 MHz..... 1179.
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*FWB, Inc. ... 30 day MBG	
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2329	PocketHammer 100 699. 2314 PH 240.1169.
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2333	Hammer Int. 100is 519. 2334 240is 979.
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7991	HammerDisk 1000FMF..... 2249.
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7319	HammerDisk 130 (optical)..... 1599.
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6499	90 MB Transportable (reqs. interface). 679.
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2467	90 MB Gold Std. Rem. Cart. (Qty. 3).... 439.
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7789	Mac 1B Interface (w/Central Pt. Backup) 39.
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2466	Mac 2B Interface (with Retrospect) .. 149.
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8781	Mac Transportable 90 PRO..... 499.
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2973	120 MB HD 519. 2972 210 MB HD .. 819.
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5899	1" 120 MB Port HD..... 499.
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3657	HitchHiker Portable Drive (40 MB) 389.
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3656	HH (80 MB) 629. 7008 HH (120 MB) 749.
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1909	DiamondDrive 1000..... 2199.
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1936	DiamondDrive 1500..... 2899.
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*MDS Drives ... 60 day MBG	
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MDS 44	SyQuest w/software ea. 439.
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MDS 88	SyQuest w/software ea. 539.
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Peripheral Land, Inc. (PLI)	
6432	3 1/2" Optical Media 65. 9737 (10 pak) \$599.
8335	PLI TurboFloppy 1.4..... 295.
8327	PLI Infinity 40 Turbo (removable)..... 599.
9752	PLI Infinity 88 Turbo (removable)..... 729.
4645	PLI Infinity MO 3.5" Optical Drive..... 1599.
2864	PLI Infinity Floptical Drive (21 MB)..... 479.
2865	Floptical Cart. (21 MB) 29. 2899 (10 pak) 259.
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8330	PLI 105 MB (Quantum)..... 599.
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7125	330 MB... 1399. 7145 520 MB..... 1699.
7140	670 MB... 1999. 7122 1.26 GB..... 2699.

*SuperMac ... 30 day MBG	
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2256	ThunderStorm..... 849.
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MEDIA

*Fuji ... 60 day MBG	
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2214	3 1/2" DS Disks (10)..... 9. 2242 (50)..... 32.
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2215	3 1/2" HD Disks (10)..... 15. 2241 (50)..... 59.
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4863	3 1/2" HD Disks (20) with storage case..... 26.
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2243	3 1/2" Color (10) DS 10. 2239 (10) HD... 16.
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3297	3 1/2" DS Disks (10)..... 9. 6148 (30)..... 25.
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3298	3 1/2" HD Disks (10)..... 15. 6375 (30)..... 42.
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1603	DG60M..... 16. 2520 DG90M..... 22.
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8185	QD2040..... 14. 1895 QD2120..... 21.
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*SyQuest ... 60 day MBG	
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5912	44 MB Cartridge (1)..... 65. 5529 (3) .. 189.
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5528	44 MB Cartridge (5)..... 310. 9728 (10) 615.
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3603	88 MB Cartridge (1)..... 100. 5531 (3) .. 292.
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5530	88 MB Cartridge (5)..... 480. 3600 (10) 950.
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*3M ... 60 day MBG	
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3943	DC2000..... 17. 1581 DC2120..... 23.
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3447	SurgeArrest Plus..... 39.
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Apple Computer	
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9773	StyleWriter Ink Cart. 22. 8499 (3 Pack) 59.
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7748	Personal LaserWriter Toner Cartridge .. 87.
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1115	LaserWriter II Toner Cartridge..... 105.
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*Avery ... 60 day MBG	
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4811	Avery 5182 (8 1/2" x 11"-Trans.-Laser)..... 22.
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7050	Avery 5660 (1" x 2 1/4"-Clear Adrs.-Laser) 32.
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5392	Avery 5196 (3 1/2"-Disk Labels-Laser)..... 29.
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*Curtis Manufacturing ... 30 day MBG	
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8973	Apple Security Kit (SL-2)..... 22.
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*I/O Design Cases ... 30 day MBG	
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8812	Ultimate Classic 64. 1941 Ultimate LC 95.
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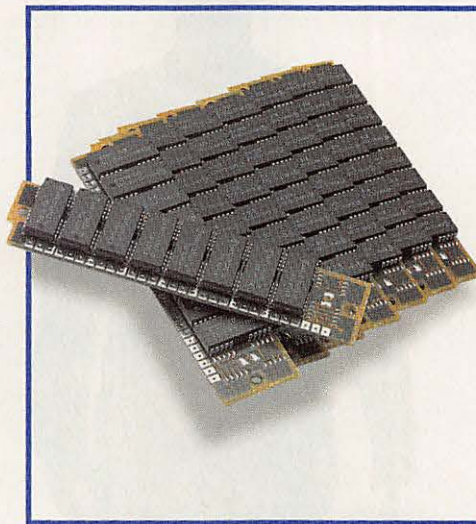
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The Upgrade Express

BY DEBORAH BRANSCUM

MACINTOSH SOFTWARE upgrades are a big business. How big? In 1991, upgrades made up 12 percent of the word processors shipped, 18 percent of the professional draw/paint programs shipped, and a whopping 37 percent of the spreadsheets shipped by members of the Software Publishers Association. Those figures are expected to climb in 1992 and beyond. Upgrades can provide one-third to one-half of a company's revenues, according to Royal Farros, CEO of WriteNow publisher T/Maker Company.

That's partly a result of a maturing industry—as fewer zippy new products are developed, companies concentrate on established applications. It also makes good business sense, because upgrades sold directly to consumers can be more profitable to software developers than initial sales through mail-order companies or retail stores. So that means software companies are vying vigorously for your dollars.

Defining Upgrades

UPGRADE POLICIES VARY BY COMPANY, but Adobe Systems seems representative of larger companies. "There are major upgrades, there are minor upgrades, and there are so-called silent upgrades," explains Adobe's LaVon Peck. "Major upgrades, let's say from a 2.0 to a 3.0, are usually charged upgrades. We do a big mailing to all of our registered users and we charge them X amount to upgrade to the new version."

For minor upgrades, also called maintenance upgrades and bug fixes, Peck says Adobe sends letters to registered users letting them know they can obtain the upgrades for the cost of shipping and handling. That's generally about \$7.50 or less for domestic users. "Then there are silent upgrades, those upgrades we don't announce because it's usually for a very small percentage of the installed base that has the problem," says Peck.

Silent upgrades, also called in-line upgrades by some companies, generally address problems specific to a certain hardware configuration or that involve a conflict with another program. Adobe, like

most companies, doesn't notify its users of the problems solved by silent upgrades; instead, the company waits for users to call in and then offers to send them the upgrade once the problem has been identified. "It's pretty straightforward," says Peck.

But it's less clear to users, if my mail is any indication. In the past 18 months *Macworld* has received 29 complaints about software upgrades. Upgrades can be buggy, difficult to obtain, too frequent, and too expensive, according to some readers.

In turn, software developers say users don't recognize the costs of developing software. "Many users don't really have insights into the costs that are required to make software," notes Steve Ruddock of Claris. "A major revision of a major software program like FileMaker Pro consumes millions of dollars in development costs. The salaries of the people who write the code would be over \$1 million alone."

What Upgrades Cost

UPGRADE POLICIES VARY WILDLY. Unsurprisingly, upgrades for professional-level programs are more expensive than for low-end offerings. And small companies tend to charge much less than large companies, perhaps because they have lower operating costs. With one exception, all the upgrades from utility publisher Connectix, for example, have been sent to registered users at no charge. Microsoft, on the other hand, is now charging \$129 for its most recent Excel and Word upgrades. (Word 5.0 owners will get 5.1 for less than \$20, according to Judy Chase, Microsoft Word product manager, who says this "deal of the century" is intended to reward users for their loyalty.)

Do free upgrades mean that Connectix is good? Do three-figure upgrades demonstrate that Microsoft is bad? Not necessarily, according to Steve Costa, executive director of the BMUG user group. "Connectix is a really small company now, but what happens when it gets large and upgrades cost them \$1 mil-

lion?" he asks. "I'm a firm believer that the more companies that can make a profit, the more companies will be out there making Macintosh products."

That doesn't mean consumers should fall for inflated upgrade offers. It does mean that developers aren't evil incarnate for trying to make a profit. It's up to you to decide when the profit is reasonable and when it stinks—and take your business elsewhere if necessary.

Reasonable people can differ over what's fair. When Word 3.0 was launched with serious problems, Microsoft yanked it and then mailed upgrades to all its users. Ditto for Beagle Bros with its initial release of BeagleWorks. The company halted sales and then sent out free upgrades. When programs are so seriously flawed, that's only reasonable. But other situations aren't so reasonable. What if you got a buggy program and the upgrade's pricey?

Speak up—it does make a difference. Developers responded admirably to individual complaints *Macworld* forwarded to the companies. In some cases they waived upgrade fees, replaced programs, and changed their policies. Last year Insignia Solutions, for example, reconsidered its SoftPC 2.5 upgrade policies in the wake of several consumer complaints, relaunched the upgrade, and lowered the price. Is that great or what?

What should upgrades cost? Developers say various rules of thumb exist to help them determine what to charge. "Some people say you should charge one-third to one-half of the original product cost," says T/Maker's Farros. "The real thing is that you charge what the market will bear. You want to price it so that people will take advantage of it."

Other sources pegged upgrade prices to the number of features added or simply the amount of work and resources involved in producing an upgrade. Microsoft's price strategy is pretty simple, according to Bill Johnson, Macintosh Excel product manager. "We try to get a return on our investment. Prices do vary."

continues



*A bust or a
bargain?*

*Depends on your
needs.*

Service Heroes

Last August 19, *Macworld* reader Richard L. Paul's PowerBook 140 failed and would not restart. So he called the Apple PowerBook Hotline. Paul was told the computer needed to be sent in for repairs, and that an Airborne Express truck would pick up the computer from his house the next morning and return it by Tuesday, August 25.

"On Monday, August 24, at 9 a.m., Airborne Express returned my PowerBook in perfect working order with a complete explanation of the repairs performed," writes Paul via America Online. "This repair did not cost me a thin dime, not even a packing box or tape. Nor did it require me to travel to the Airborne Express shipping office to drop it off. I think Apple deserves some recognition because they did what they promised; they did it faster than they promised."

Upgrade Do's and Don'ts

COMPANIES HAVE TO LOOK OUT FOR their own best interests and so do users. Be an educated consumer. Check out your options, and try these tips for a more satisfying upgrade path.

- Send in that registration card! Newsletters listing upgrades, software bundles, and other forms of official company offers and info will never make their way into your mailbox unless you register. (And keep copies for yourself, in case developers lose their copies.)

Many companies have upgrade "windows" that give recently registered customers discounted or free upgrades. Claris, for example, announced FileMaker

Pro in April 1990 and shipped it in October 1990. Consumers who bought FileMaker II after April 1 received free upgrades to the new version.

- Call tech support if you're having problems with a program—a secret upgrade may save the day. "The presumption is that if there is a problem, people will call," says Claris's Ruddock.

- Don't assume an upgrade is necessary. I'm still using Word 4.0 and it works fine. Apparently zillions of folks lobbied Microsoft for a grammar checker, but I'm not one of them. I'm missing out on 5.0's other benefits too, but that's OK because the older version serves my needs. Feel free to ignore the upgrade escalator unless

it takes you to an appealing location. Talk to user group members, go online, and read the mags for details before you plunk down big money for an upgrade.

- Find out what an upgrade fixes. Any fabulous new features will be trumpeted in big type in a company's marketing literature. But you may have to call the company to find out if any significant bug fixes that you need are included in the upgrade. (The bug fix alone may be available for a nominal fee.)

- Determine the true cost of an upgrade. Does the upgrade offer include manuals, or do manuals cost an additional \$29, as in a recent Claris offer? Are there other hidden costs? "It's not just how much the upgrade costs, but it's also how much hardware does this company require that I buy to run the program acceptably," claims T/Maker's Farros, who is not exactly neutral on the topic. Retraining time and expense may also be a factor if an upgrade is very different from its predecessor.

- Don't assume developers offer great deals. Usually they do, but readers have reported a few cases in which major upgrades through a software developer were close to the cost of a new program via mail order. In such cases, you might

continues

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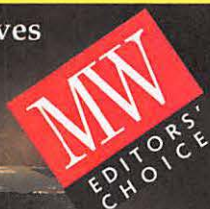
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Automatic built in head cleaner- Allows your drive to remain clean and error free.

SCSI II compatible interface- This gives your drive the ability to remain compatible for years to come.

45 watt switching power supply & a metal cabinet - Assures that your drive is well protected and powered.

MTBF 50,000 hours- Means that your NuDesign drive will handle years of usage

Available with Retrospect -The first name in Macintosh backup software (a 248.00 value!)

NuDesign 2.1 Gig DAT With SoftBackup Software 1098.00

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The NuDesign 3.5" Optical... 128mb in your shirt pocket at an great price!

The NuDesign 3.5" Optical is MacWorlds Editors Choice Fast, reliable and a great buy!

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- Sampo 20"\$598
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- Include Interface cards
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- The SONY 19" Trinitron is one of our best buys yet! True Trinitron color at a great price!
- Includes 8 bit or 24 Bit Video board and cable
- 2 page display supports all Mac IIs, the SI, SE-30, and the LC



- NuDesign Full Page Display
- Grey Scale For CI, SI, Quadra.....\$398
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Grey Scale System **\$898.00**

- The SAMPO is a high quality dual page display without the high cost!
- Includes 1 bit, or 8 bit Bit Video board and cable
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NuDesign Full Page Grey Scale **\$398.00**

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- With 8Bit interface.....\$1498
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- "Boasts the highest vertical resolution..." "Tamarack and Umax produced the best images..." MacUser
- "Tamarack and Umax excel in speed and color accuracy" MacUser
- Includes Adobe Photoshop • 8 1/2 x 14 Scanning area

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Umax UC-1200S With PhotoShop\$3498.00

Transparency/Slide Scanner Option.....\$898.00

- Incredible 1200 dpi scanning resolution recognizes 1 billion colors internally
- Single-pass design increases scanning speed
- Includes Adobe Photoshop

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Circle 58 on reader service card

A Macintosh to start a

Imagine you could design your own personal computer. What would it be? It would be fast, of course. Faster than your basic 486 machine. Fast

The Apple Macintosh Quadra.

enough to handle the rendering, animating, design and analysis jobs that often require a workstation.

It would have immense storage and memory capacity. And it would have features like high-

performance networking and accelerated video support built in.

You would make it flexible enough to run any kind of application. Affordable enough to put on every engineer's desk. And as long as you're fantasizing here, you'd make it as easy to set up, easy to learn and easy to use as an Apple® Macintosh® personal computer.

But it's not a fantasy. It's a Macintosh Quadra.™

By any measure, the Macintosh Quadra 700 and 950 are two of the most powerful personal computers ever built. Both are based on the Motorola 68040 (rated at 20 and 25 MIPS, running at 25 and 33 MHz), which integrates the processor, math coprocessor and RAM cache all onto one chip.

They're up to twice as fast as any of their forebears. Fast enough to beat the chips off comparably priced 486 computers from IBM, Compaq and Dell.* And fast enough to make



Macintosh Quadra runs all the most powerful engineering software.



Built-in 24-bit video lets you create photo-realistic images without the expense of an extra card.

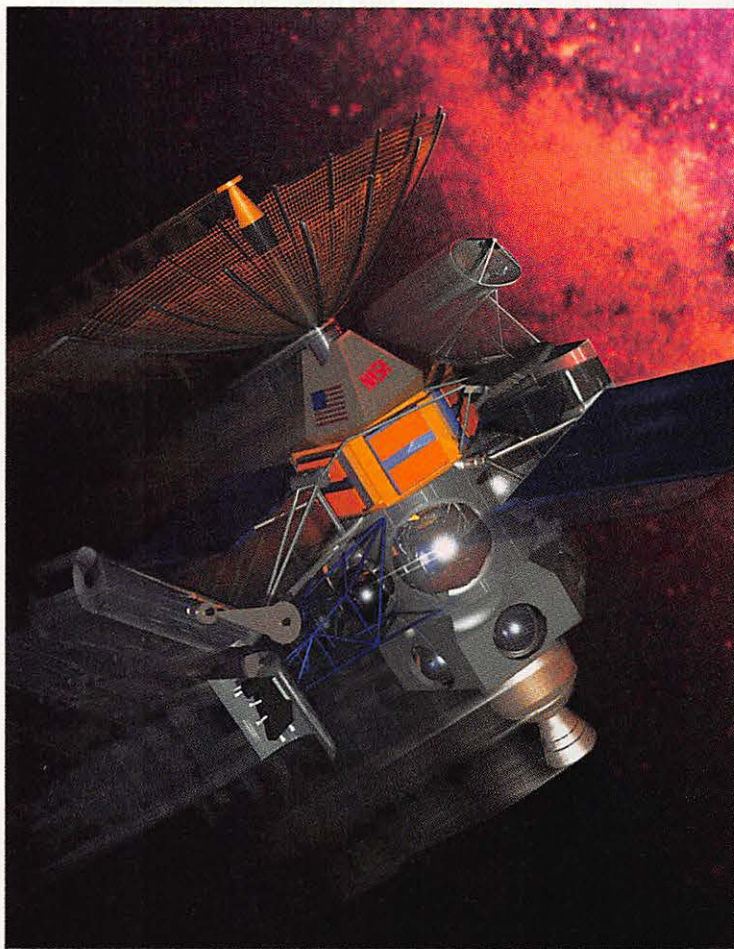
programs like AutoCAD, MicroStation Mac®, MacBRAVO! and VersaCAD perform at a level once seen only in dauntingly complex workstations.

High-performance subsystems provide built-in support across the board: Ethernet networking, accelerated 24-bit video** support and faster SCSI and NuBus™ slots.

You can add a 400MB hard disk to both

*Comparisons are based on a 1991 independent research study conducted by Ingram Laboratories that tested a variety of personal computers running applications available for both the Macintosh and Microsoft Windows 3.0 environments. **24-bit video support for up to a 16" product specifications and descriptions were supplied by the respective vendor or supplier. Orbiter images created by Jerry Flynn. ©1992 Apple Computer, Inc. Apple, the Apple logo, AUX, Mac, Macintosh and "The power to be your best" are registered trademarks and Macintosh Quadra and is a trademark of Wolfram Research, Inc. MicroStation is a registered trademark of Bentley Systems Inc. MS-DOS is a registered trademark and Windows is a trademark of Microsoft Corp. Motorola is a registered trademark of Motorola Corp. NuBus is a trademark of Texas Instruments.

with the power revolution.



the 700 and the 950 to accommodate the largest CAD files. And the 950 even lets you add a CD-ROM drive or a removable cartridge drive, and a disk array or more than a gigabyte of internal hard disk storage.

You can increase the memory of the 950 to up to 64MB of RAM for handling compute-intensive applications like three-dimensional modeling and stress analysis.

Over your network, the unique Apple interapplication

communications architecture lets you easily take advantage of features like distributed processing, allowing programs like RenderPro and BackBurner to utilize excess CPU cycles on other Mac computers or workstations for faster renderings.

And Macintosh Quadra fits in with the PCs you already own. The built-in Apple SuperDrive™, used with Apple's new Macintosh PC Exchange software, allows you to share files easily with MS-DOS PCs via floppy disk or over a network. And with Apple's fully compliant version of UNIX®—A/UX®—you can even run UNIX, X Window, MS-DOS and Macintosh programs all at the same time.

It all adds up to the kind of power that moved *PC Week* to give the

Macintosh Quadra its highest satisfaction rating in the categories of overall performance, price relative to performance, expansion capability and ease of installation and configuration.†

Your authorized Apple reseller would be glad to show you all this and more. For the name and location of the one nearest you, call 800-538-9696, extension 200.

And soon you'll discover the latest power of Macintosh personal computers. The power to start a revolution. The power to be your best.®



There are two Macintosh Quadra models. The 950 sits next to your desk; the 700 fits on top of it.



Macintosh Quadra significantly outperforms 486 PCs from IBM, Compaq and Dell running Windows 3.0.



WORD PROCESSOR UPGRADES

Product	Date Available	Suggested Retail Price	Upgrade Price
CLARIS MACWRITE			
5.0	7/87	\$125	\$25
II	3/89	\$249/\$129*	\$75/\$69*
MICROSOFT WORD			
1.0	1/85	\$195	—
3.0	2/87	\$395	\$50
3.01	7/87	\$395	free
3.02	1/88	\$395	free
4.0	4/89	\$395	\$75
5.0	12/91	\$495	\$129
5.1	12/92	\$495	\$20 to 5.0 owners; \$129 otherwise
T/MAKER WRITENOW			
1.0	10/86	\$175	—
2.0	12/88	\$195	\$25
2.2	2/90	\$195	\$39**/\$49
3.0	4/92	\$249	\$49**/\$69
WORDPERFECT			
1.0	4/88	\$395	—
1.0.1	8/88	\$395	free
1.0.2	4/89	\$395	free
1.0.3	10/89	\$395	\$10
2.0	1/91	\$495	\$89
2.1	1/92	\$495	\$89
2.1.2	7/92	\$495	\$89

*Price changed 2/92. **Price for first six months. Information provided by the respective software companies. Does not include all maintenance or silent upgrades, or short-term special offers.

want to buy an entirely new package via a mail-order company that offers money-back guarantees, since few developers offer that kind of guarantee (T/Maker and a few others are exceptions). Or you might consider competitive upgrades.

Compare upgrade policies and prices when shopping for new software. As "Word Processor Upgrades" shows, the price of upgrades over time may equal or exceed the initial purchase price. (Remember, street prices are lower than the suggested list prices shown.)

What Users Want

GENE STEINBERG, A Mac forum assistant on America Online, says "a software publisher should not charge for an update that's necessary to fix a bug or make the

program compatible with a new version of Apple system software." Moreover, some reasonable effort should be made to alert customers as to the existence of bug fixes, he says. He is not alone in craving that information.

"I think that the most unconscionable practice in the industry is not releasing bug lists," says Emil Flock, president of San Francisco-based Computer Hand Holding, a third-party technical-support company. "I think that's irresponsible, and I think users should boycott any company that doesn't provide them."

Them's fightin' words, but I tend to agree. All developers should post lists of bugs, bug fixes, and workarounds on online services, and make written versions of that information available to software owners who call and request it, instead of making that info known only to people with company-certified symptoms. Bug-fix info on demand—let's push to see it from software developers everywhere. **m**

Research assistance by CAROLYN BICKFORD.

Send nominees for sainthood to Service Heroes, Macworld, 501 Second St., San Francisco, CA 94107, or via AppleLink (Macworld1) or America Online (Branscum). Conversely, drop *Conspicuous Consumer* a line if a company is ignoring you.

DOUBLE THE SPEED OF YOUR LC/LCII FOR JUST \$599

Introducing the IMPACT™ 030 Accelerator from Extreme Systems The Accelerator Designed With Your LC/LCII in Mind

Perhaps no investment will provide a greater return for LC/LCII owners than a new accelerator card from Extreme Systems. For just \$599, the new 32MHz IMPACT™ 030 boosts the performance of your LC/LCII by 200 - 300%! A fully functional 68030 allows the use of System 7's virtual memory, and a 32K external cache improves overall performance. An optional math chip is available for just \$99. With IMPACT installed, the LC or LCII exceeds the performance of a Mac IIci!

Because IMPACT is designed for your LC/LCII, there are no adapter or installation hassles. Installation is literally a snap. The IMPACT's low 3.9 watt power consumption (within Apple's 4.0 watt recommendation for the PDS slot) won't shorten the life of your computer's power supply. A leading competitor's card, designed as one card + adapter fits all Macs, consumes 9.0+ watts. **Ouch!**

For LC owners, the EXTENDER™ provides LCII features for as little as \$149, or \$219 with a math chip. To increase math performance only, the MATH EXTENDER™ brings it to the LC/LCII for only \$69.

Extreme Systems has been a leading OEM supplier of accelerator cards for 4+ years. All Extreme products come with a 30 Day Money Back guarantee and a 3 Year Limited warranty.

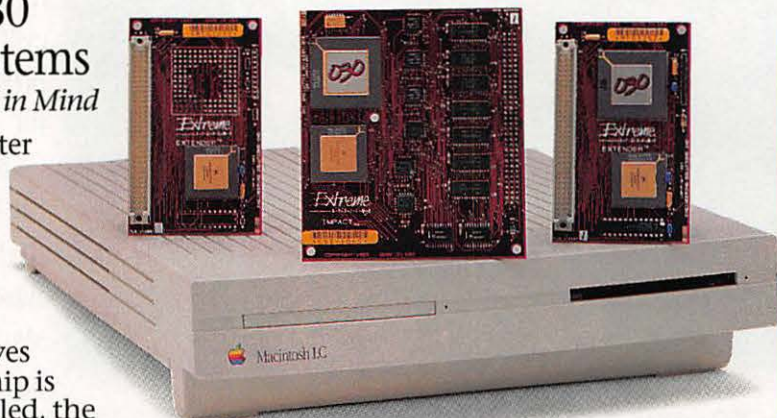
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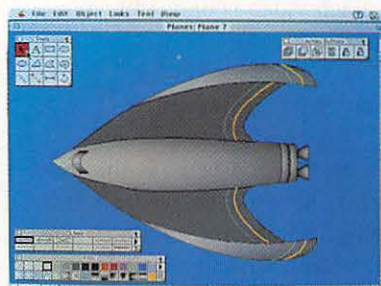
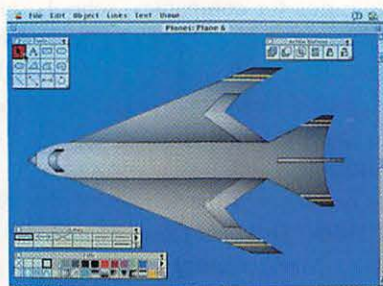
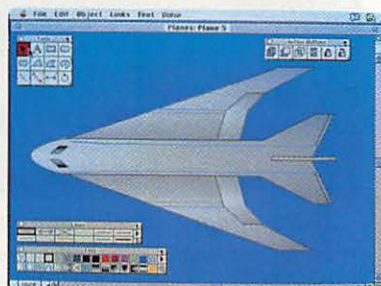
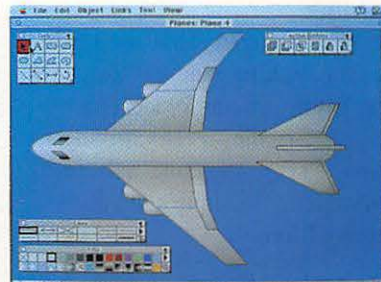
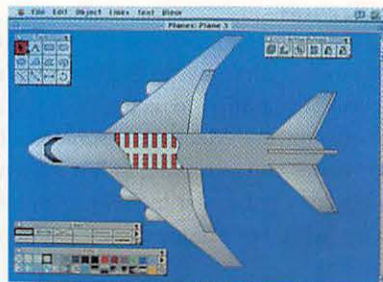
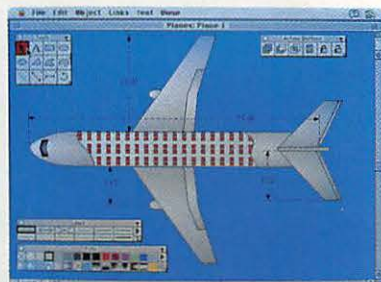
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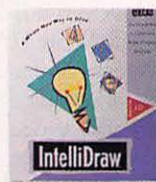
Or, for that matter, a lot of other things. In fact, with Aldus® IntelliDraw™ — for Macintosh and Windows — whatever you draw can easily be changed with a couple clicks of the mouse. (Not to mention how easy it is to draw in the first place.)

It's all thanks to IntelliDraw's 43 new, totally unique, powerful features. Like, for example, the Symmetricon™ and the Connecticon™.

With the Symmetricon you simply draw one side of an object and the other side (or sides) are drawn automatically. On other programs, you'd have to draw each side one step at a time.

As for the Connecticon, it lets you change dimensions and perspective almost instantly (see the plane illustrations, here). Again, using other drawing packages, such modifications would be laborious at best.

And of course, that's only two of the 43. With IntelliDraw, you also get to take advantage of things like alignment guidelines and alignment frames (which automatically align and maintain spacing of multiple objects even if you decide to rearrange, add, or subtract objects in your drawing), master objects (which save a ton of time by letting you change multiple cloned objects simply by changing the one master item), and, as they say, much, much more.



Which logically leads to the following conclusion: what you really need is a free copy of our demonstration video. So call 1-800-685-4190.

We'll not only help you change planes, we'll help change how you feel about drawing.

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The first benefit of the training library is the price. Each video is only \$49. While other training companies have raised their prices out of sight, MacAcademy videos cost the same as five years ago.

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The next bit of good news is the huge selection of training videos available from MacAcademy. Below you will find a sampling of the videos currently available.

Quality

No blurry screens. No paid actors reading scripts. No frills. Each MacAcademy video features one of our top trainers recreating the classroom atmosphere and teaching you each program from start to finish.

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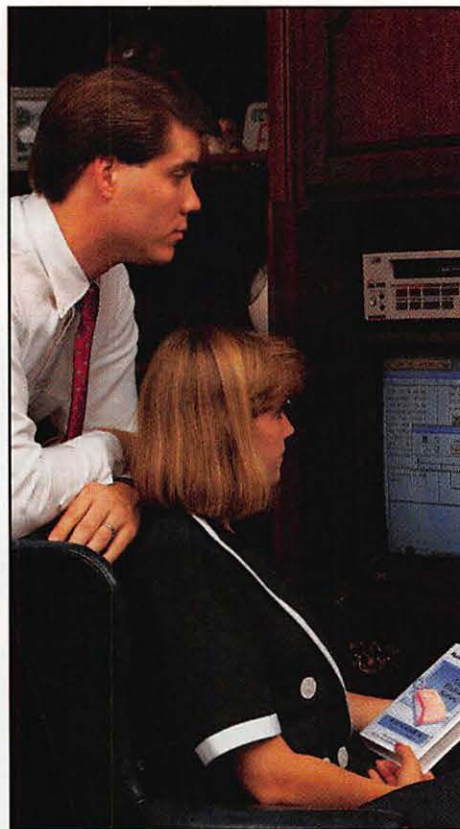
Many of our customers say our videos cut their learning curve by up to 70%! Videos give you the ability to actually *see* each technique on the Macintosh screen. The video allows you to replay, to fast-forward, or to find any particular technique immediately by using our unique counter system.

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MacAcademy is the winner of the 1992 **MACWORLD World Class Award**. Readers chose MacAcademy as the top trainer in the nation. No other organization even came close! When it comes to training, MacAcademy has the best reputation in the business. You deserve World Class training at an extremely low price. In addition, all videos carry a complete 30 day guarantee.



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Call 800-527-1914 with credit card or purchase order info or mail or FAX your order to the address and number below. Add \$3 plus \$1/video shipping and handling.

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<input type="checkbox"/> Adobe Illustrator 3.2 Video #2	<input type="checkbox"/>
<input type="checkbox"/> Adobe Illustrator 3.2 Video #3	<input type="checkbox"/>
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<input type="checkbox"/> Aldus PageMaker Video #1	<input type="checkbox"/>
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<input type="checkbox"/> Aldus PageMaker Video #3	<input type="checkbox"/>
<input type="checkbox"/> Aldus PageMaker Video #4	<input type="checkbox"/>
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<input type="checkbox"/> Microsoft Works Video #4	<input type="checkbox"/>
<input type="checkbox"/> QuarkXPress Video #1	<input type="checkbox"/>
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Videos can be updated upon release of new software versions for only \$14.95.

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DECEMBER 1992

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ADOBE PHOTOSHOP	2.0.1	2MB/6.0.2		\$199
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BUSINESS SENSE	1.6	1MB/6.0.7		\$69
CA-CRICKET PRESENTS	2.0.1	1MB/6.0	*	
CALENDAR	1.1.2	512KE/6.0		FREE
CANOPENER	2.0	512K/3.0		\$29
CANVAS	3.0	1MB/6.0.2	1/92	*
CAPTURE	4.0	1MB/6.0		\$30
CARBON COPY MAC	2.0	1MB/6.0.5	4/92	*
CAT III	1.2	1MB/6.0	*	
CAUSE	2.12	1MB/6.0	*	
CC:MAIL FOR MACINTOSH	2.0	1MB/6.0.4		\$25
CHECKLIST	2.0	1MB/6.0	2/92	*
CHECKMARK PAYROLL	4.6	512K/4.2		\$50
CINEMATION	1.0	4MB/6.0.7	7/92	NA
CLARIS CAD	2.0v3	2MB/6.0		\$79
CLARIS RESOLVE	1.1	1MB/6.0.5	1/92	\$20
CLARISWORKS	1.0	1MB/6.0.5	3/92	NA
CLICKCHANGE	1.05.2	1MB/6.0.4		\$5
CLICKPASTE	2.1	1MB/6.0		\$20
CMS UTILITIES	7.0	2MB/7.0		\$25
COLORSTUDIO	1.5	4MB/6.0.5	3/92	*
COMPACT PRO	1.33	1MB/4.2		FREE
COMPUSERVE INFORMATION MANAGER	1.5.1	1MB/4.1	12/92	*
COMPUSERVE NAVIGATOR	3.1	512K/4.1		*
CONCERTWARE+	4.0	512KE/4.2		\$15
CONNECTIONS	2.1	2MB/6.0.5	11/92	FREE
CONTROL CLASSIC	1.5	4MB/6.0.5	*	
CORRECT GRAMMAR	3.0	1MB/4.2	8/92	\$29.95
DATA CLUB CLASSIC	2.0	2MB/6.0	8/92	*
DATA SHAPER	1.2	1MB/6.0		\$40
DECK	1.03	2MB/6.0.7		FREE
DELTA GRAPH PROFESSIONAL	2.0	2MB/6.0.5	5/92	\$69.95
DESCARTES	1.04	2MB/6.0.3		FREE
D.E.S. DOCUMENT EXCHANGE SYSTEM	4.1	1MB/6.0	*	
DESIGNCAD	3.0	2MB/6.0.5	*	
DESIGNCAD 2D/3D	3.0	2MB/6.0.5	11/92	\$50
DESIGNSTUDIO	2.0	1MB/6.0	*	
DESK	3.08	1MB/6.0.5		\$24.95
DESKPAINT	3.07	1MB/6.0.5		\$19.95
DIGITAL DARKROOM	2.0	1MB/6.0.4		\$80
DISKDOUBLER	3.7	1MB/6.0.2		\$15
DISKEXPRESS II	2.10	1MB/6.0		FREE

continues

V. = version #. Req. = min. RAM and system software required. * = last time (in the past year) this or an earlier version was reviewed. \$ = cost of update to registered owners. NA = first version, not applicable. * = contact your dealer for update policy. Blue = new version. Yellow = reviewed product.



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Apple 13" RGB	19" color
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DISKIT PRO	1.1	1MB/6.0	4/92	*
DISKTOP	4.0.2	1MB/6.0		*
DISPLAY ADBUILDER	1.1	1MB/6.0.3		*
DOCUCOMP II		1MB/6.0	11/92	\$29.95
DOLLARS & SENSE	5.0	512KE/3.2		*
DOUBLE HELIX	3.5	1MB/6.0		\$99
DREAMS	1.1	1MB/6.0.2		*
DYNAPERSPECTIVE	2.3	2MB/6.0.5		\$149
DYNODEX	2.0	1MB/6.0	2/92	\$25
EASY COLOR PAINT	2.02	1MB/6.0.2		*
EHELP	2.0	1MB/4.1		\$445
EMPOWER II	4.0.7	2MB/4.2		*
ENCORE	2.5	2MB/6.0.2		*
ENHANCE	2.0	2MB/6.0.3		\$100
EVOLVE	1.1	2MB/5.3		\$25
EXODUS	4.0	2MB/6.0.3		\$75
EXPRESSIONIST	3.0	1MB/6.0.2		\$49.95
EZ VISION	1.0	1MB/6.0.3		NA
FAIR WITNESS	1.2	1MB/6.0.2	10/92	FREE
FASTBACK PLUS MAC	3.0	1MB/6.0	4/92	\$30
FAST FORMS	2.0	1MB/6.0		\$25
FASTLABEL	3.1	1MB/6.0		\$10
FASTTRACK SCHEDULE	2.0	1MB/6.0		\$89
FILEGUARD	2.7	1MB/4.2		\$18
FILEMAKER PRO	2.0	1MB/6.0		\$89
FILEVISION V	1.1	1MB/6.0.2		*
FINALE	2.6	1MB/6.0.2		FREE
FIRST THINGS FIRST	2.1.2	1MB/6.0.4	4/92	*
FLEXICAD	2.20	5MB/6.0.4		*
FONTMONGER	1.0.5	2MB/6.0.2		FREE
FONTOGRAPHER	3.5	1MB/4.2	11/92	*

PRODUCT	V.	REQ.	*	\$
FONTSTUDIO	2.0	1MB/6.0.5		*
FORM Z	2.0	2MB/6.0		*
FOXBASE+/MAC	2.01	1MB/6.0		FREE
FRAMEMAKER	3.0	1MB/6.0	3/92	*
FREEDOM OF PRESS LIGHT	3.0.3	2MB/6.0.3		\$25
FREEDOM OF PRESS PROFESSIONAL	3.0.2A	4MB/6.0.3		\$250
FULL IMPACT	2.0	1MB/6.0		\$50
FULLWRITE PROFESSIONAL	1.5	2MB/6.0.2		*
GENERIC CADD	2.0	2MB/6.0.5		\$100
GEOQUERY	3.02	1MB/6.0	11/92	*
GOFER	2.0	1MB/4.1	6/92	\$25
GQL	3.0	2MB/5.0		\$75
GRACELAN	2.0	1MB/6.0.5		*
GRACELAN UPDATE MANAGER	1.1	2MB/6.0.5		FREE
GRADE MACHINE	5.0	1MB/6.0.5	50% OF LIST	
GRAMMATIK MAC	2.05	1MB/6.0		\$15
GREAT GANTT	1.4	1MB/6.0		*
GREAT PLAINS ACCOUNTING SERIES	6.0	1MB/4.2		*
GREATWORKS	1.0	1MB/6.0.2	1/92	NA
GUIDE	2.0	512K/4.1		\$50
HAND-OFF II	2.2.5	2MB/6.0.2		FREE
HELP	1.0.3	1MB/6.0	2/92	FREE
HYPERCARD	2.1	1MB/6.0.3		\$49
HYPERDA	2.1	1MB/6.0		\$29
ICON-IT	2.1	1MB/6.0.2		*
IF:X FORMS DESIGNER	1.1	1MB/6.0		FREE
IGOR	1.2	2MB/4.2		\$35
IMAGE GRABBER	3.0	1MB/6.0	2/92	\$18
IMAGESTUDIO	1.7	1MB/6.0		\$99

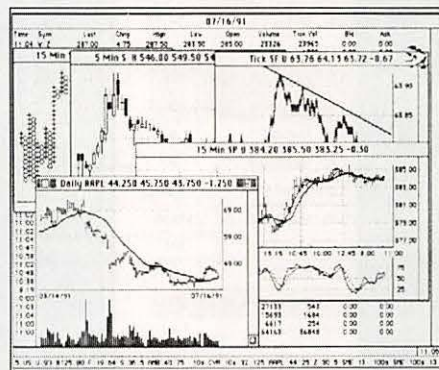
PRODUCT	V.	REQ.	*	\$
INFINI-D	2.0	4MB/6.0.4		*
INITPICKER	2.02	1MB/6.0		\$10
INSIDE OUT	II	1MB/6.0.2		*
INSPIRATION	3.0.1	1MB/4.2		*
INSTANT-EXPERT PLUS	2.0	1MB/5.0		FREE
INTOUCH	1.1.7	512KE/4.2	3/92	FREE
KIWIENVELOPES	3.1	512KE/4.1		*
LABVIEW	2.2	4MB/6.0.5		*
LANGUAGE SYSTEMS FORTRAN	3.0	2MB/6.0.4		\$100
LAPLINK MAC III	3.2	512K/2.0		FREE
LAPLINK MAC PLUS III	3.0	512K/2.0		*
LASERPAINT COLOR II	1.02	1MB/6.0.3		FREE
LETRASTUDIO	2.0	2MB/6.0	10/92	*
MACANALYST	3.1	2MB/6.0		*
MACARCHITRION	5.5	2MB/6.0.3		*
MACBRAIN	3.0	1MB/6.0.5		\$295
MACDRAFT	2.1	1MB/6.0.2		*
MACDRAW II	1.1	1MB/6.0		*
MACDRAW PRO	1.5	2MB/6.0.5		*
MACENVELOPE	5.1	1MB/4.2		\$29.95
MACENVELOPE PLUS	2.0	512KE/3.2		\$50
MACFLOW	3.7	1MB/6.0		\$30
MACFORTRAN II	3.1	4MB/6.0.3		\$99
MACGLOBE	1.0	1MB/6.0.4	4/92	*
MACLABELPRO	1.5	1MB/6.0.3		\$19.95
MACLINKPLUS/PC	6.0	1MB/6.0.3	3/92	*
MACMONEY	3.5	512KE/4.0		\$12
MACPAINT	2.0	512KE/3.2		\$25
MACPALETTE II	2.2	1MB/6.0.5	9/92	*
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MACRENDERMAN	1.1	5MB/6.0.5		\$75
MACROMIND DIRECTOR	3.1	2MB/6.0.5		\$149
MACSCHEDULE	2.5	1MB/6.0		\$30
MACSCHEDULE PLUS	1.0.5	1MB/6.0		FREE
MACSPIN	3.01	512K/4.3	3/92	*
MACTERMINAL	3.0	512K/3.2		\$65
MACTOOLS	2.0	2MB/6.0	10/92	\$55
MACTOPS	3.1	1MB/6.0.5	*	
MACVISION	4.1	2MB/6.0.4	*	
MACWRITE II	1.1v2	1MB/6.0		FREE
MAGIC	1.1	2MB/6.0.7	8/92	FREE
MANAGING YOUR MONEY	4.0	1MB/6.0.3	*	
MANAPRO GENERAL LEDGER	3.1	1MB/6.0		NA
MAPLE V		2MB/6.0.7	5/92	*
MARCOPOLO	1.1	1MB/6.0		FREE
MARKET ANALYZER PLUS	2.0	2MB/6.0.2		\$99
MARKETMASTER	3.5	2MB/6.0.3	*	
MARKUP	2.0	1MB/6.0		\$30
MASTERFINDER	1.1	2MB/6.0.5	11/92	*
MASTERJUGGLER	1.57	512K/6.0		\$15
MASTERPLAN	1.03	512K/6.0.5		FREE
MASTER TRACKS PRO	5.0	1MB/4.1		\$45
MATHCAD	2.06	1MB/6.0.2		FREE
MATHEMATICA	2.0	1MB/6.0	*	
MATHTYPE	3.0	1MB/6.0.3		\$49
MATHWRITER	2.0	2MB/6.0.5	*	
MATLAB	4.0	1MB/3.0	*	
MEDIA TRACKS	1.01	1MB/6.0.2		FREE

PRODUCT	V.	REQ.	*	\$
MENUFONTS	4.01	1MB/6.0.5	5/92	\$20
METADESIGN	3.0	1MB/6.0		\$49.95
METAPICT	2.0	512KE/4.5		\$69
MICHAEL'S DRAW	1.0	1MB/6.0.5		NA
MICROPHONE II	4.0	2MB/6.0	7/92	*
MICRO PLANNER MANAGER	1.0	2MB/6.0	*	
MICROSOFT EXCEL	4.0	1MB/6.0.2	10/92	*
MICROSOFT FILE	2.0	512K/3.2	*	
MICROSOFT MAIL	3.1	1MB/6.0.2	*	
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MICROSOFT POWERPOINT	2.01	1MB/6.0		FREE
MICROSOFT PROJECT	3.0	2MB/6.0.4		\$149
MICROSOFT WORD	5.0	512KE/3.2	4/92	\$129
MICROSOFT WORKS	3.0	1MB/6.0.5		\$79
MINDLINK	2.0	1MB/6.0	*	
MINDWRITE	2.1	512KE/4.2	*	
MINICAD+	4.0	1MB/6.0	*	
MINITAB	8.2	1MB/6.0.1	6/92	*
MOCKPACKAGE PLUS UTILITIES	4.4	512KE/3.2		\$15
MODELSHOP II	1.1	1MB/6.0.2	3/92	FREE
MORE	3.1	1MB/4.1	*	
MR. FILE	1.1.1	1MB/4.2		FREE
MULTI-AD CREATOR	3.5	2MB/6.0.3		\$149
MULTILEDGER	2.0	512K/3.2		\$75
MUSICPROSE	2.1	1MB/6.0		FREE
MUSIC PUBLISHER	2.5.2	1MB/6.0		\$15
MYADVANCEDMAILLIST	3.0	512K/4.1	*	
MYDISKLABELER III	3.0.4	1MB/6.0	*	
M.Y.O.B.	3.0	1MB/6.0		\$79
MYTIMEMANAGER	4.0	1MB/6.0.3	*	
NETMINDER ETHERNET	2.1	2MB/6.0		\$100

PRODUCT	V.	REQ.	*	\$
NETWORK BUNDLE FOR THE MAC	3.0	512K/3.2	*	
NETWORK SUPERVISOR	2.0	2.5MB/6.0.3	8/92	*
NISUS	3.06	1MB/6.0.2	8/92	*
NORTON UTILITIES FOR MACINTOSH	2.0	1MB/6.0.4	10/92	\$39
NOVALINK PROFESSIONAL	2.1	2MB/6.0.7	7/92	FREE
NOW UTILITIES	4.0	2MB/7.0	2/92	\$29
NUBASE PRO	1.54	1MB/4.1	9/92	*
OMNIPAGE	3.0	4MB/6.0		\$25
OMNIPAGE PROFESSIONAL	1.0	5MB/7.0	*	
OMNIS 7	1.1	2MB/6.0	12/92	FREE
ONCUE II	2.0	512K/6.0.2		\$34.95
ON LOCATION	2.0	1MB/6.0.5	6/92	\$25
ON SCHEDULE	2.0	1MB/3.0	*	
PACO	2.0	1.5MB/7.0	*	
PANORAMA	2.03	1MB/6.0	5/92	*
PEACHTREE ACCOUNTING	1.2	1MB/6.0.5	*	
PERFORMER	3.61	2MB/6.0.2	*	
PERSONAL PRESS	2.0	1MB/6.0.3		\$39.99
PHONENET LIAISON	3.0	1MB/4.2		\$75
PHOTOMAC	1.5	2MB/6.0.3		\$75
PICTURE	1.0	512K/6.0		NA
PICTUREBOOK+	1.0	1MB/6.0	2/92	*
PICTUREPRESS	2.0.4	2MB/6.0.4	*	
PIXELPAINT	2.1	2MB/4.1	*	
PIXELPAINT PROFESSIONAL	2.01	4MB/6.0.5		\$125
PLAINS & SIMPLE	1.06	1MB/3.2	*	
PLANISOFT	1.3	512K/4.2		\$48
POSTERWORKS	2.1	2MB/6.0.3	*	

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Each time you hit the print key, you send thousands of tiny information bits scurrying through the wires. Often they arrive at the printer at the same time as someone else's tiny information bits, resulting in a situation not unlike the one you see here. Leaving the controller to somehow make sense of it all.

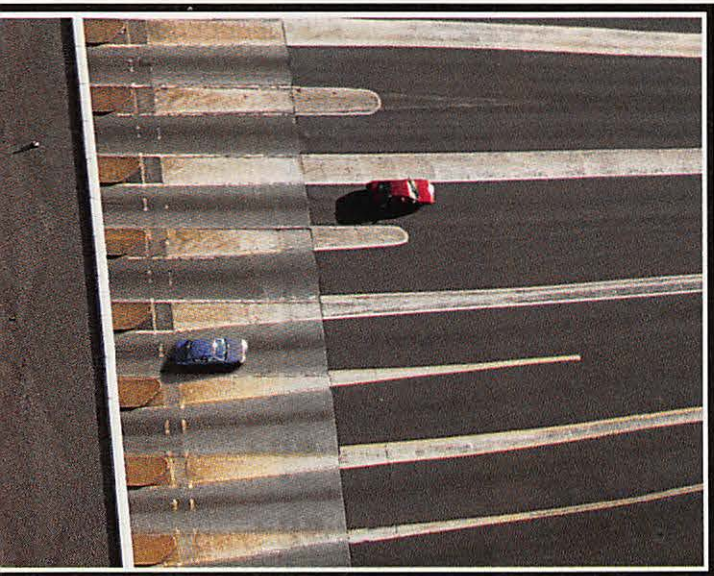
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POWERTRAX	1.1	1MB/6.0.5		FREE
PRACTICA MUSICA	2.2	512K/3.2		*
PRESENTER PROFESSIONAL	1.2	5MB/6.0.5		\$95
PRO-CITE	2.0	1MB/6.0.2	6/92	\$95
PRODIGY	3.1	1MB/6.0		FREE
PROFESSIONAL COMPOSER	2.3	1MB/6.0.3		FREE
PROGRAPH	2.5	2MB/6.0	6/92	\$49.99
PROTOTYPER	3.0	1MB/4.1		\$99
PUBLISH IT	2.0	1MB/6.0		*
PUBLISH IT EASY	2.5	1MB/4.2		\$49.95
PYRO	4.0.1	512K/4.1		\$15
QUARKXPRESS	3.1	2MB/6.0.5	7/92	*
QUICKDEX II	2.3	1MB/6.0.5		*
QUICKEN	3.0	1MB/6.0.5		*
QUICKKEYS	2.1.2	1MB/6.0.2		*
QUICKLETTER	1.1.5	1MB/6.0		\$25
QUICKMAIL	2.5.1	512KE/3.2		*
QUICKSHARE	2.0	512KE/3.2		*
QUICKSHOT	2.1	1MB/4.2		\$5
RAGTIME 3	3.1	2MB/6.0		\$150
RAY DREAM DESIGNER	2.2	4MB/6.0.5	9/92	*
READ-IT OCR PERSONAL	3.0.A	2MB/6.0.5		\$49
READ-IT OCR PROFESSIONAL	3.0	2MB/6.0.3		*
READYSETGO	4.5	1MB/6.0		*
RESORCERER	1.1	1MB/6.0		FREE
RETROSPECT REMOTE	1.3	1MB/6.0		*
REUNION	3.0	2MB/6.0.5		\$39
RIGHTWRITER	5	1MB/6.0		*
RIVAL	1.19x	1MB/6.0		FREE
RUNPC	3.1.2	512K/6.0.4		NA
SAM	3.0	1MB/6.0		\$29
SCHEDULEMAKER	3.01	1MB/6.0		\$25
SCSI PROBE	3.4	2MB/6.0		FREE
SCULPT 3D	2.1	8MB/6.0.5		FREE
SCULPT 4D	2.1	8MB/6.0.5		\$1000
SEND EXPRESS	2.1	1MB/6.0.2		*
SENSIBLE GRAMMAR	2.1	1MB/5.0	11/92	\$30
SHADOWWRITER	2.0	2MB/6.0.3		\$20
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SMALL BUSINESS ACCOUNTING SYSTEM	2.1	512K/4.1		FREE
SMART ALARMS	3.07	1MB/6.0.2		\$28
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Entry Level SoftPC: \$125

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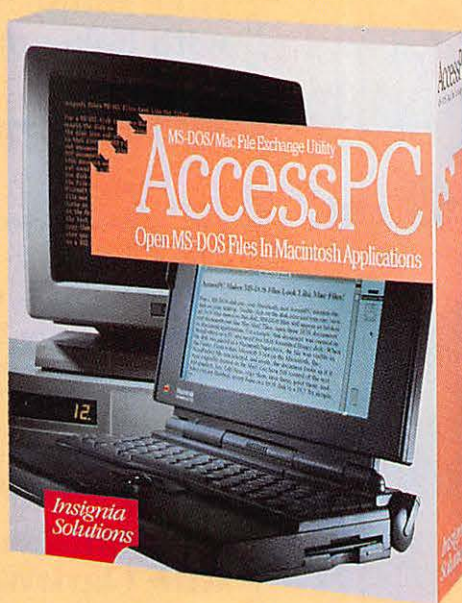


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Access PC:

Now Your MS-DOS Files Can Look Just Like Macintosh Files

Access PC is a system utility that helps you use MS-DOS documents in your Macintosh. Just pop any MS-DOS disk into a Mac SuperDrive, double-click on the disk icon that appears, and all MS-DOS files appear as if they were Macintosh files. Your MS-DOS files look and act just like Macintosh files. Directories appear as folders, and data files have the familiar Macintosh document icon. You can select any file and open it in a Macintosh application. Insignia Solutions #03664



SoftAT:

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SoftAT is the highest performance product in the SoftPC family. Designed for use on the most powerful Macintosh computers, SoftAT expands the basic PC emulation to include support for more demanding applications. SoftAT includes all the features of Universal SoftPC, and adds three key features to help you run graphics-intensive PC programs such as AutoCAD (level 10) and Flight Simulator. Insignia Solutions #04768

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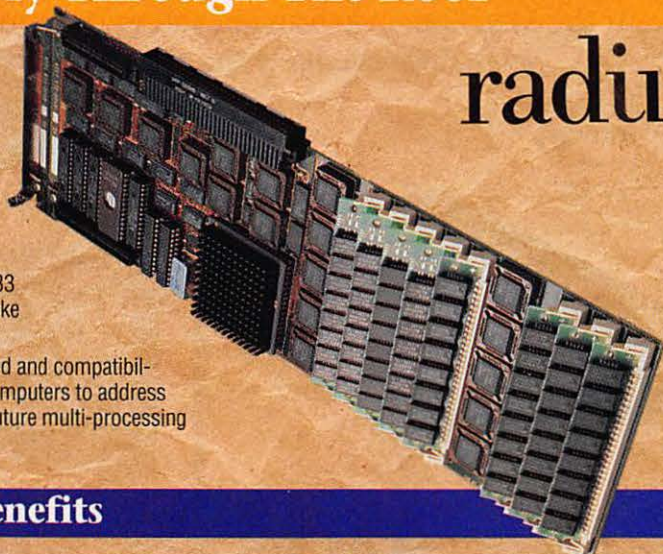
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Radius Rocket 33 \$2175

Blast your II, IIx, IIcx or IIfx computer into another dimension of performance with the Radius Rocket 33 accelerator. This awesome 33MHz Motorola 68040 powerhouse increases the processing speed of the original Mac II by up to eight times, making it even faster than the Quadra 700 in most cases—and it costs less than Apple's own upgrade. You won't believe how fast your desktop publishing and productivity applications will run. The Rocket 33 includes an integrated math coprocessor so it's ideal for math-intensive applications like CAD, 3D rendering and scientific analysis.

Rocket 33 also allows you to specify cache settings by application for maximum speed and compatibility. MODE32 from Connectix (also included) enables Rockets in Mac II, IIx and IIcx computers to address more than 8MB of memory with System 7. In addition, Rocket 33 is compatible with future multi-processing software from Radius. Radius #05250

radius™



Key Features

- 33MHz 68040 processor
- Flexible memory architecture
- Connectix MODE32 included
- Application cache settings
- Built-in Processor Direct Slot
- QuickDraw acceleration with Radius display interfaces
- QuickCAD display list processing

Benefits

- Increases processor performance up to 8 times faster than the original Mac II
- Supports 4 to 128MB of standard DRAM in 8 SIMM slots
- Enables Rockets in Mac II, IIx and IIcx computers to address more than 8MB of memory with System 7
- Allows you to specify the cache mode used by the 040 for each application for maximum speed and compatibility
- Provides faster screen response for routine operations like scrolling, window resizing and area fills
- Provides faster screen response for routine operations like scrolling, window resizing and area fills
- Accelerates vector-based functions like zooms and redraws for select CAD applications



RocketShare

\$2134

Take your Mac where no Mac has been before! RocketShare gives you simultaneous use of your Mac's CPU and multiple Radius Rockets. The resulting "true" multi-tasking capability dramatically increases the productivity of your Mac. Any process that ties up the Macintosh CPU for extended periods of time can be off-loaded to one of the Rockets, thus freeing up your Mac CPU so you can keep working productively! Dump your PostScript rasterization ("RIP'ing") off to one of your Rockets and go on working on your layouts. Let one of your Rockets do the scanning while you continue on with your word processing. The possibilities are endless.

Under RocketShare, each Rocket in the system appears as an additional CPU that is launched independently of your main Mac processor. RocketShare maintains full functionality of the motherboard processor, providing 100% compatibility with pre-Rocket systems. If your time is valuable, you cannot afford to be without it. #06004

Key Features

- Cooperative multiprocessing
- Foreground/background processing
- Parallel processing
- BusNet

Benefits

- Allows the concurrent use of the Macintosh and one or more Radius Rockets
- Time-consuming tasks may be off-loaded to Rockets for processing in the background while the Macintosh is used for interactive, foreground work
- Applications which distribute processing over a network of Macintosh computers using System 7's IAC capabilities run without
- Rockets and the Macintosh communicate over NuBus at speeds superior to computers networked via Ethernet or LocalTalk

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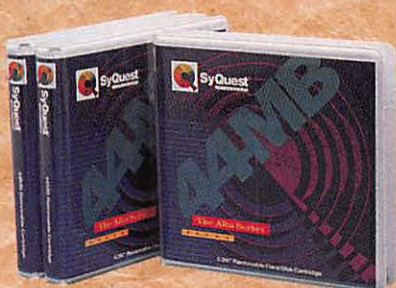
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Fuji Data Cartridges

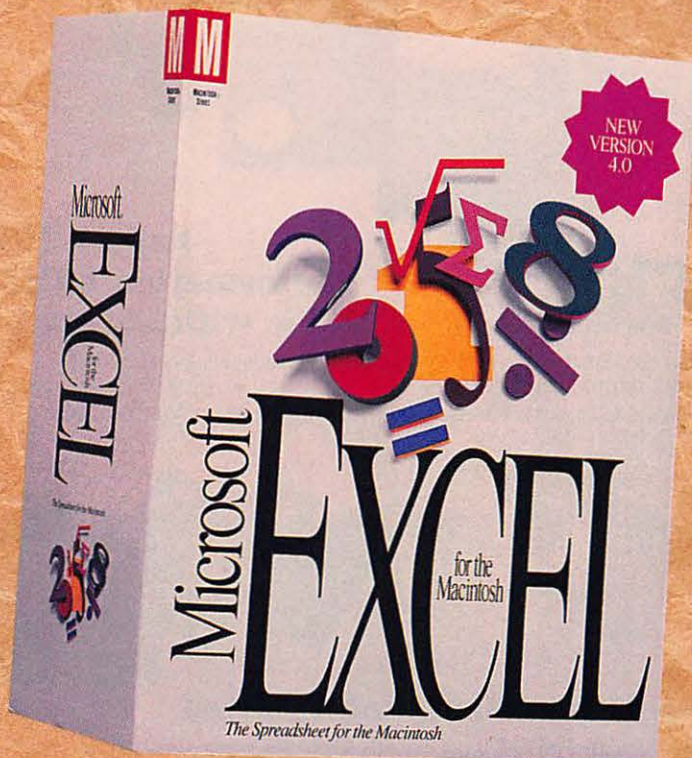
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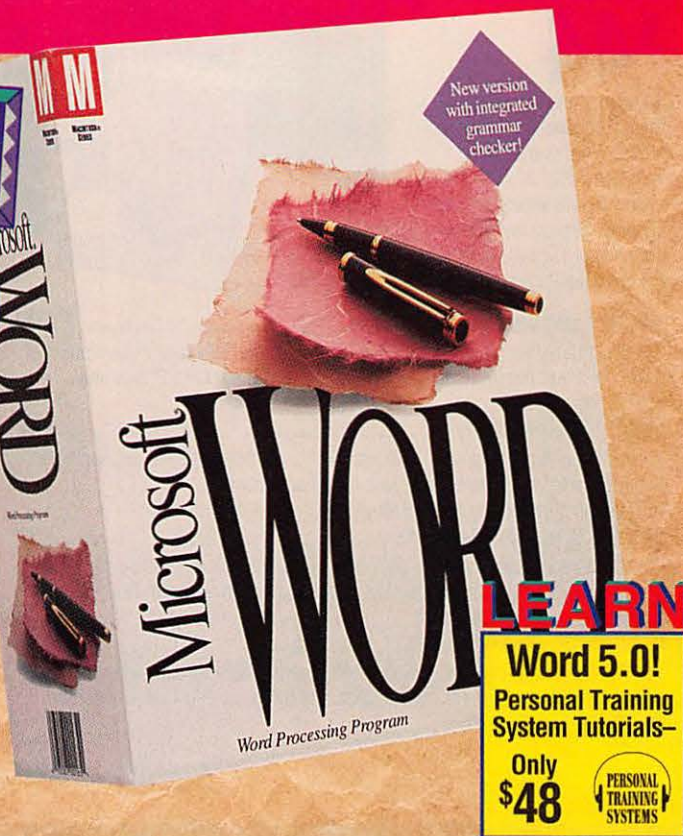
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Some of Microsoft Word's useful features include:

- Built-in grammar checker, spelling checker and thesaurus
- Built-in drawing tools
- Equation Editor for easy creation and formatting of equations
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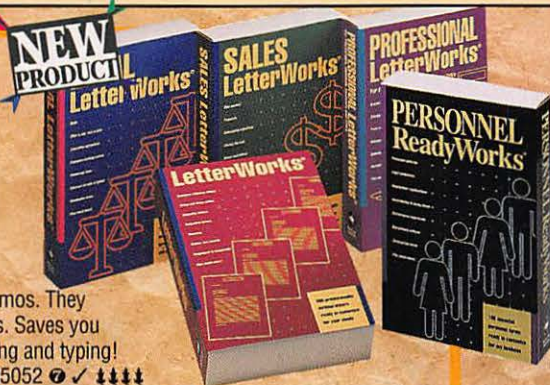
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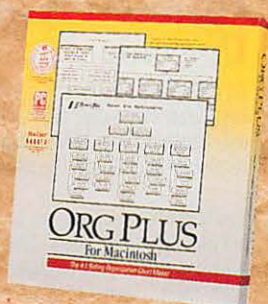
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Office Manager 2.1 \$74

Manage your small business with one software package! At a time when most office software is getting more complicated, along comes White Crow Office Manager, an incredibly easy-to-use productivity program designed especially for small businesses! Office Manager maintains addresses, writes letters, prints envelopes and labels, keeps a to-do list and tracks client jobs. The optional Mail Manager module allows you to easily set up programmed mailings to your customers and includes a utility for weeding out duplicate names. Another option called Office Manager Remote allows you to share Office Manager's address files on other Macs, even if they aren't networked! Addresses can be entered on any machine, then the address files are periodically merged using a floppy disk! Perfect for the Mac PowerBook. System 7 compatible. White Crow Software #05324 ✓



OfficeManager Remote 2.1 \$58

With this add-on addition to Office Manager you can use your address file on other Macs *without* being on a network. Add new addresses on any computer, then you can periodically merge all address files using a floppy disk copy of Office Manager. This is an ideal mail management system for the Macintosh PowerBook. Office Manager Remote requires Office Manager. White Crow Software #05325 ✓

Office Manager w/ Mail Merge \$108

Simplify your mail sorting and fine-tune your mail delivery. Mail merge gives Office Manager expanded sorting capabilities plus date & quantity sensitivity when printing mailing labels or merge letters. It will prevent the same person from receiving the same mailing twice, or will send repeat mailings at predetermined intervals. Ideal for newsletters or other repetitive mailings. White Crow Software #05326 ✓



WE SHIP WORLDWIDE! CALL 1-206-883-3088

WordPerfect \$278
2.1

Using System 7's Publish and Subscribe, WordPerfect will automatically keep track of changes that you (or someone else) make to imported files and it will automatically update your WP documents accordingly. WordPerfect 2.1 also gives you full placement of graphics in your text and a color drawing program for modifying imported artwork without ever leaving the program. You also get QuickTime compatibility and more.

WordPerfect Corporation #03972 ✓
#05738 ✓ LetterPerfect\$94



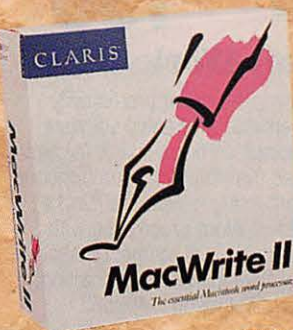
When you purchase WordPerfect 2.1 and Using WordPerfect 2.1 (#05234) receive the book for only \$19. Regular price of book #05109 Using WordPerfect 2.1\$24

COMPETITIVE
UPGRADE**\$68**

#05691

\$148**WriteNow 3.0**

A two-time winner of MacUser's "Best New Word Processor" award, WriteNow 3.0 is one of the fastest word processors for the Mac. WriteNow 3.0 includes a lightning-fast 135,000-word spelling checker, a 1.4 million-word thesaurus DA, Microsoft Word compatibility and a FREE full version of GrammatikMac 2.0, the best-selling grammar/style checker (a \$40 value!). T/Maker #00641 ✓

**\$88****Claris
MacWrite II**

Get the job done faster, with better results. MacWrite II® software gives you all the tools you need for a wide range of writing tasks, from simple memos and reports to sophisticated business proposals, multi-column newsletters and 1,000-page manuscripts. Check your spelling with the built-in 100,000-word dictionary. Or find just the right word with the 220,000-

word desk-accessory thesaurus. Read, edit or insert

files created in other word processors like MS Word or WriteNow. Open a file in MacWrite II and start typing—then save it back to its original format.

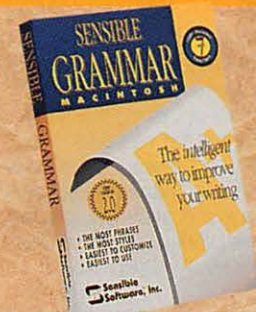
Claris #04703 ✓

NISUS \$91
Compact

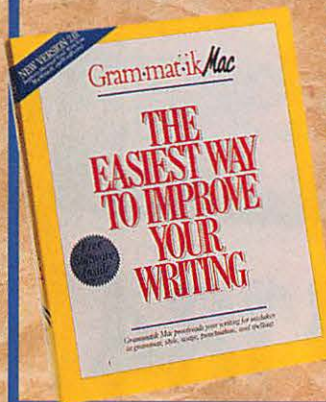
Conserve precious RAM on your PowerBook with NISUS Compact, the powerful and efficient word processor which runs in less than 400k! Some of NISUS's many features include: Fuzzy Find (finds files by entering approximate, sound-alike file names); Write with the freedom to undo all your mistakes, saved or not, all the way back to the opening document; and much more. Fully compatible with the full version of NISUS. NISUS Software #00999

#03479 NISUS 3.06\$237

#01473 Qued IM\$74

**\$54****Sensible
Grammar 2.1**

Grammar check your document without leaving your word processor. Sensible Grammar includes nine user-selectable writing styles and checks for grammar and punctuation errors. Version 2.1 (with System 7 or MultiFinder) lets you check the whole document, or only the parts you select. Perfect for PageMaker. Sensible Software #00483 ✓

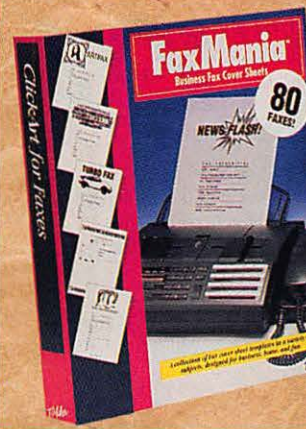
**\$41****Grammatik
Mac 2.0**

With over 1.5 million users, Grammatik Mac is one of the most popular grammar utilities available. It helps you write clear, concise, persuasive reports, letters, manuscripts, etc. Grammatik Mac 2.0 finds thousands of errors and gives you instant, complete advice. Customizable modules allow you to choose your writing style, add your own rules and help screens and much more!

Reference Software #03143 ✓

Thunder 7**\$54**

Thunder 7 delivers benefits well beyond your word processor's onboard spelling checker or thesaurus. Thunder 7 will interactively indicate each spelling or punctuation error you make, as you make it. Using Thunder 7, you can batch check and expand your creativity with the integrated thesaurus. With Thunder 7's glossary, you can automatically correct your most frequently misspelled words or expand your creativity with the integrated thesaurus. Baseline Publishing #03941

**\$24****FaxMania**

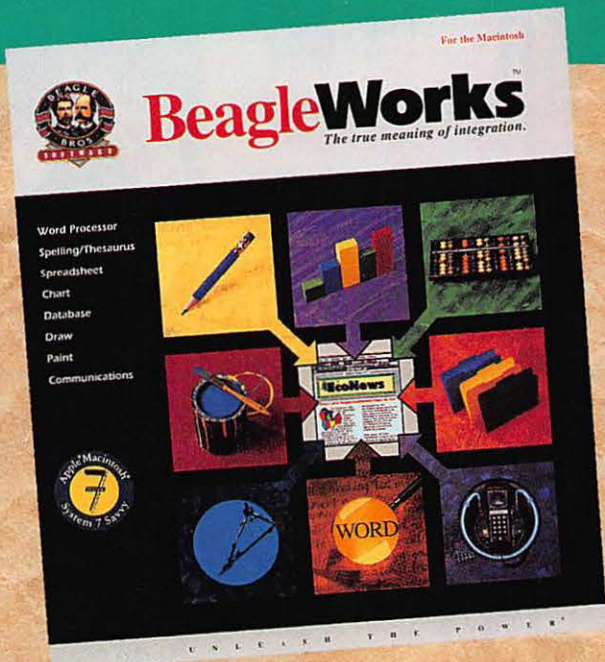
What kind of "FAX MOOD" are you in? FaxMania includes 80 business fax cover sheet templates that you can personalize and use right out of the box. Simply:

- Choose the template you want
- Type in the "to" and "from" information and your message
- Send via fax modem or print and insert into a standard fax machine

T/Maker #05063

INTEGRATED

Available Now!



\$184

BeagleWORKS

This award-winning software sets new standards for the term "integration." BeagleWORKS combines a full-function word processor (complete with spelling checker and thesaurus), a spreadsheet, a charting program, a database, a painting program, a drawing program and communications modules into one harmonious package. This truly integrated program, lets you combine data from all other modules into a single document and makes changes (edit in context), all without leaving your document! Beagle Bros Software #04327 ✓✓



BeagleWORKS Competitive Upgrade

Switch to BeagleWORKS and save! To qualify for the BeagleWORKS upgrade offer, your order must include the first page of your user manual from any one of the following products: AppleWorks 3.0, AppleWorks GS, Microsoft Works, Desk, Ragtime, GreatWorks or Claris Works. Once you have your new BeagleWORKS, send in a copy of the front cover of your manual with the Beagle Brothers registration card and you'll become a registered owner, eligible for updates and technical support.

Beagle Bros Software #04583 ✓✓

\$94

**COMPETITIVE
UPGRADE**

\$94

#04651

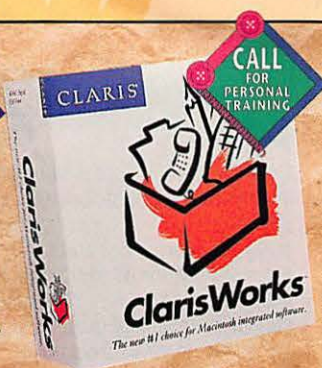


**FREE
QUICKEN
4.0**

ClarisWorks

\$196

Increase your office productivity. With ClarisWorks you can easily create professional-looking documents that combine colorful graphics with a variety of page layout options, including multiple columns and linked text frames. ClarisWorks features interactive environments which provide seamless integration of tools. FREE Quicken 4.0 until 1/1/93. Not available with Competitive Upgrade. Claris #04466

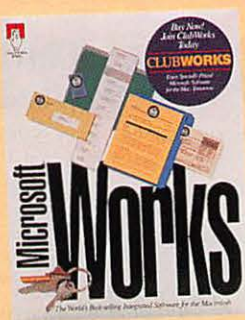


**NEW
VERSION**

\$158

Microsoft Works 3.0

Get five of the most popular productivity tools in one versatile, affordable software product. Microsoft Works is one of the best software values available today for someone with varied computing needs. The Works package includes: Word processing with spelling checker and mail merge; Database with reporting; Spreadsheet with charting; and much more. Microsoft #00567



\$198

GreatWorks 2.0

Any owner of Microsoft Works, ClarisWorks, Ragtime or AppleWorks can now cross over the to versatility and power of GreatWorks at an attractive competitive upgrade price. Requires proof of ownership of competing software product. Symantec #00458 ✓✓



\$86

#00582



WordPerfect Office

\$88

WordPerfect Office™ for the Macintosh® is a collection of office automation programs for Macintosh networks. Some of Office's amenities include mail, calendar, notebook, file manager and forms maker. These desk accessories allow you to send electronic mail, schedule events and resources for people on the network, create databases

and organize your desktop. You'll soon wonder how you survived without it! WordPerfect #04170 ✓✓

**\$3 OVERNIGHT
DELIVERY**

ORDER BY 2 A.M. WEEKDAYS FOR NEXT DAY DELIVERY

Claris \$267 **FileMaker Pro 2.0**

Take control of your computer files with FileMaker Pro, the extended flat file manager that makes file management easy. Its look-up function lets you extract information from other files. A host of graphical tools gives you access to powerful layout and organization features, making your reports and forms more appealing. With customizable scripts and buttons, you don't have to understand advanced database concepts to use it. And as your needs grow, FileMaker Pro can grow right along with you, into a comprehensive, file-sharing, workgroup environment.

Claris #03478 ✓

**COMPETITIVE
UPGRADE**

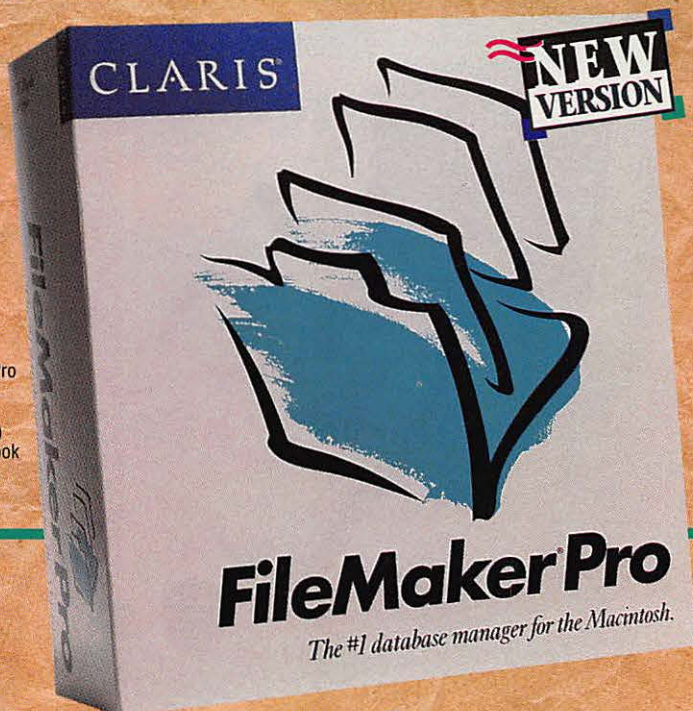
\$108

FileMaker Pro 2.0
Competitive Upgrade
#05032

**SAVE
\$5
ON THIS BOOK**

When you purchase FileMaker Pro and Using FileMaker Pro (#05237) receive the book for only \$19.

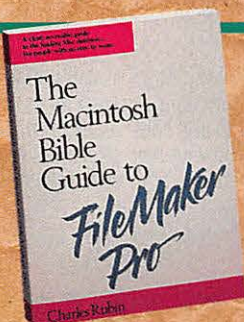
Regular price of book (#05131) Using FileMaker Pro \$24.



Mac Bible Guide \$11 **To FileMaker Pro**

No FileMaker reference guide covers FileMaker like the Mac Bible Guide To FileMaker Pro. This comprehensive guide presents information in an easy-to-read and systematic format. It's virtually the only book written for both database experts and the average FileMaker user.

Goldstein & Blair #04093

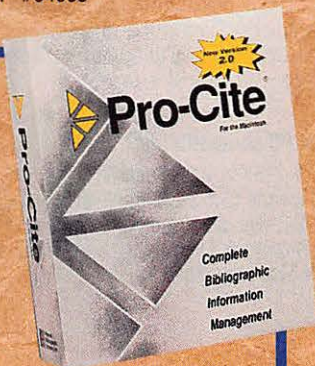


Pro-Cite 2.0 \$194

Pro-Cite is a powerful database program that saves you hours by enabling you to manage and format bibliographic and text information automatically. New features include instant searching, expanded word processing support and increased record capacity.

Personal Bibliographic Software #04532

#04266 Pro-Search \$148



Helix Express \$298

Helix Express provides ready-to-go solutions in every box that help you manage everything from personal contacts and all the information you need to stay competitive. The multiuser software in every box allows your users to access the same information, with immediate updating. Document features allow you to store and retrieve documents right in the database and launch documents in their native applications. It's non-procedural and object-oriented—no programming language required!

Helix Technologies #05677



\$508 **4th Dimension 2.2**

4th Dimension is a high-end database designed for intermediate and power users. It provides depth of function and sophisticated data manipulation like nothing else on the market.

Acius #02648 ✓

#03973 4th Dimension Write \$228
#00411 4th Dimension Calc \$224
#03330 File Force \$198



**FREE
UPGRADE TO
VERSION 3.0
WHEN
AVAILABLE**

Microsoft \$288 **FoxBASE+/Mac 2.01**

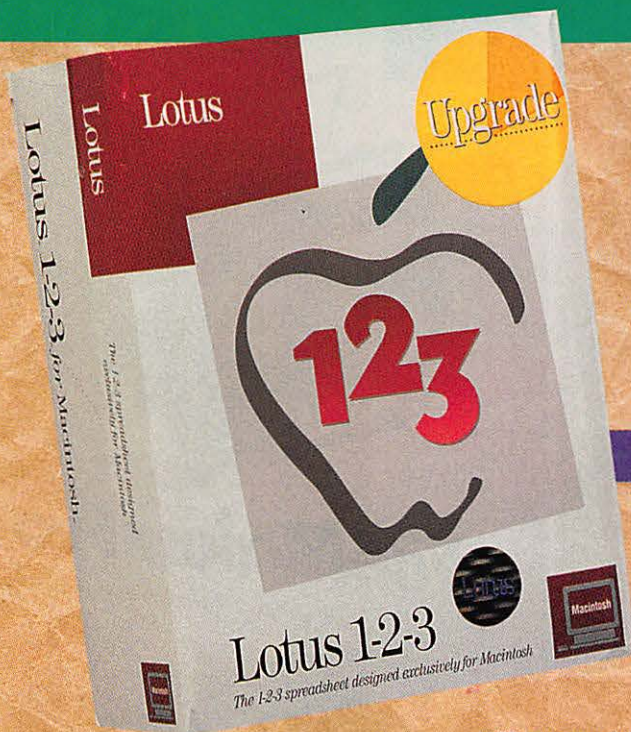
In a comparison test against competing database management systems, Microsoft FoxBase+ 2.01 accessed data up to 200 times faster. Its versatility and features offer powerful relational capabilities and a sophisticated programming environment.

Microsoft #02581

#02163 FoxBASE+/Mac Runtime 2.01 \$178
#02582 FoxBASE+/Mac 2.01 6Pk. \$398



Lotus 1-2-3 for Macintosh



**COMPETITIVE
UPGRADE**

\$94

#00518

Now the Mac Zone makes it easy to switch to Lotus 1-2-3 for the Mac.

Upgrade from a competing spreadsheet product and we'll ship you Lotus 1-2-3 for this super-low competitive upgrade price.*

*Competitive upgrade price requires proof of ownership of a competing spreadsheet software product.

Lotus 1-2-3: What's in it for you?

• Designed exclusively for Macintosh from the word *go*.

At last, there's a spreadsheet that exploits the capabilities of the Apple Macintosh to their fullest, especially under System 7. The spreadsheet functions you use most often are all just a mouse click away—whether you need to edit cells, enter formulas or create graphs. Customize your spreadsheet and desktop with tear-off menus and floating toolboxes. Move them anywhere. Then just click to close them so they're out of your way. Lotus #00518

• More powerful than a locomotive.

Lotus 1-2-3's true 3D worksheet management lets you tackle complex tasks, like consolidations, without complicated linking or dialog boxes. Bring remote data right into Lotus 1-2-3 through DataLens and the Apple Data Access Language. Then work with it using full relational database power and custom database forms. No matter what you're doing, you'll see only one set of menus, tools and file formats. You'll get so much done with so little to learn.

• Complete Excel and PC compatibility.

Yes. You heard right. 1-2-3 for Macintosh directly reads and writes Microsoft Excel for Macintosh files. So you can make the switch to 1-2-3 and never look back. What's more, 1-2-3 for Macintosh is fully compatible with all 1-2-3 files and macros, including PC versions. More than fourteen million people already rely on Lotus 1-2-3 for accounting, budgeting, forecasting, analysis, proposals, presentations and much more. Now Mac lovers can, too.

Lotus 1-2-3 features at a glance:

Mac Savvy Features:

- Floating toolboxes and palettes for custom workspace
- Full System 7 support
- In-cell editing
- Context-sensitive, graphical help
- Select ranges before or after starting commands
- Includes 256 supported colors/49 fill patterns/230 line styles and thicknesses

Powerful Spreadsheet Features:

- True 3D worksheets
- Pop-up functions and range names
- Menu promotion
- Same menus, tools and file formats across worksheets, graphs and macros
- Adobe Type Manager included
- Automatic compression on all printers
- Macro recorder always active
- Customizable database forms
- Relational joins and queries
- Directly reads FoxBASE and dBASE files (.DBF)

Compatibility Features:

- Reads and writes all 1-2-3 files
- Runs all 1-2-3 macros without translation
- Reads and writes Excel files
- 1-2-3 Classic menu provides keystroke compatibility

Powerbook Sweepstakes Information

Official Rules

To enter: Simply send us a postcard! PowerBook Sweepstakes, 17411 NE Union Hill Rd., Redmond, Washington 98052-6716. • Entrants must be 18 or older to be eligible • Offer valid in the United States only. • **NO PURCHASE NECESSARY.** • One entry per person. • Prizes awarded by random drawing on 1/10/93. • Winners are responsible for all applicable taxes. • No substitutions will be made for any prizes except at the option of the sponsor for prizes of equal or greater value. • Prizes may not be transferred nor will cash substitutes be offered. • This offer is not open to employees of Lotus, Mac Zone or any other person or organization responsible for this promotion. • Late, lost, illegible, misdirected or incomplete entries are ineligible. • Odds of winning depend on number of entries received; One prize will be awarded. • Winners consent to the use, without compensation, of their name, address and likeness in promotional and advertising material related to the sweepstakes. • Winners must execute an affidavit of eligibility and release or prize may be forfeited. • Offer void where prohibited by law. • To obtain a list of winners, send a written request with a self-addressed stamped envelope to PowerBook Sweepstakes, 17411 NE Union Hill Rd., Redmond, Washington 98052-6716. • **Good luck!**



FAX YOUR ORDER ANYTIME: 1-206-881-3421

Integrate Sound & Graphics

Claris Resolve Competitive Upgrade

Whether you're simply tracking expenses or creating sophisticated business models, Claris Resolve gives you the analytical tools you need to make informed financial decisions. Present your final analysis with integrated graphics and text for expressive, persuasive reports. Resolve gets you noticed! It comes in the same powerful and easy-to-use format you've come to expect from Claris. Upgrade now from a competing software product (Excel, Lotus 1-2-3, WingZ or Full Impact) and take advantage of the special upgrade price.

Hot Claris Resolve Tip

- Import graphics created in MacDraw Pro to jazz up your charts and financial presentations

COMPETITIVE
UPGRADE

\$94
#00699

Claris Resolve

\$168

...the spreadsheet that gets you and your ideas noticed.

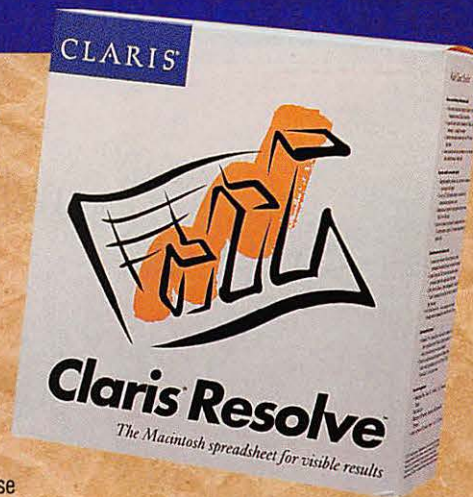
Even if you've never used a spreadsheet before, Claris Resolve can help you create impressive financial reports or build sophisticated business models quickly and easily.

For starters, there are menu-driven analytical functions to simplify number-crunching tasks like calculating and model building. And there are tools to let you create graphics and 3D charts. You can also scan images and import text to build documents that present your information clearly and concisely. You can even use the familiar MacDraw-like tools to zoom in on a small detail, or zoom out to see the big picture.

And Resolve has been written specifically to take advantage of the powerful features of Apple System 7, such as Balloon Help, Publish & Subscribe and Apple Events. Claris #04306

Features:

- Visualize your results with 25 full-featured chart types
- Integrate numbers, text, graphics and sound to create persuasive reports
- Create HyperCard-like buttons and automate routine



business tasks with Resolve Script

- Utilize complete support for Apple System 7 to tap into the power of Resolve from within other applications
- Enjoy full support of built-in Claris technologies including context-sensitive online Help and a customizable 110,000-word spell checker you can use with other Claris applications
- Suggested retail price \$399

\$294

Microsoft Excel 4.0

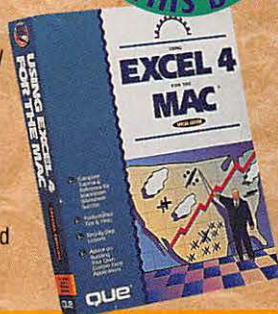
The leading spreadsheet for the Macintosh just got even better. Microsoft Excel version 4.0 for the Apple Macintosh was designed with you in mind. It gives you access to more powerful features and makes everyday spreadsheet tasks easier than you ever dreamed possible. Microsoft #00227

VERSION
UPGRADE

\$98
#04545

Using Excel 4.0 for the Mac-Special Edition \$24

Increase your business potential! Unlock the full power of Microsoft Excel 4.0. *Using Excel 4.0 for the Mac-Special Edition* provides an outstanding combination of tutorial-style lessons and reference materials specifically selected and designed to help you create the most effective worksheets possible—right away! Quick Start tutorials show you easy ways to design, enter and edit worksheets and charts that increase your financial effectiveness. Prentice Hall #05498

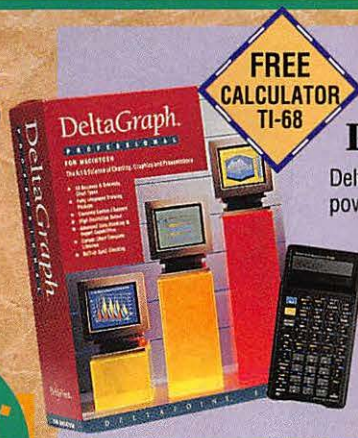


SAVE
Special Book/
Software Bundle
\$313
#05049
ON THIS BOOK

FREE
CALCULATOR
TI-68

DeltaGraph Professional \$198

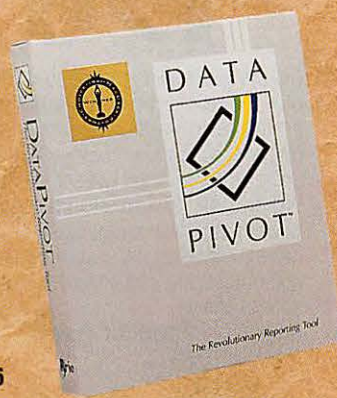
DeltaGraph Professional is one of the most powerful tools available for designing dynamic and memorable charts for your business and presentation needs. Every aspect of your charts and presentations is under your control: formatting options, built-in custom chart templates, a complete set of integrated drawing tools, text outlining, bullet charts and more. Import/export clip art and graphics. DeltaPoint #04805 ✓



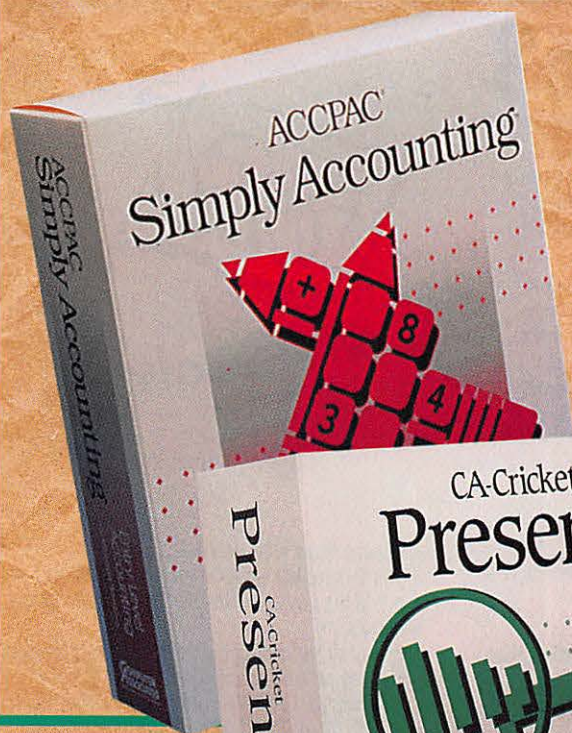
DataPivot \$226

DataPivot is a dramatic new report builder with a twist. Its dynamic data "frame" allows you to interchange rows and columns, define groups, totals and sub-totals, and build reusable templates that reveal the structure and meaning of your data. DataPivot supports System 7.0 (Publish and Subscribe) IAC and DDE and accepts data from virtually any source. Brio Technology #05057 ✓

#05058 DataPrism \$306



Get The Job Done With Powerful Business Tools



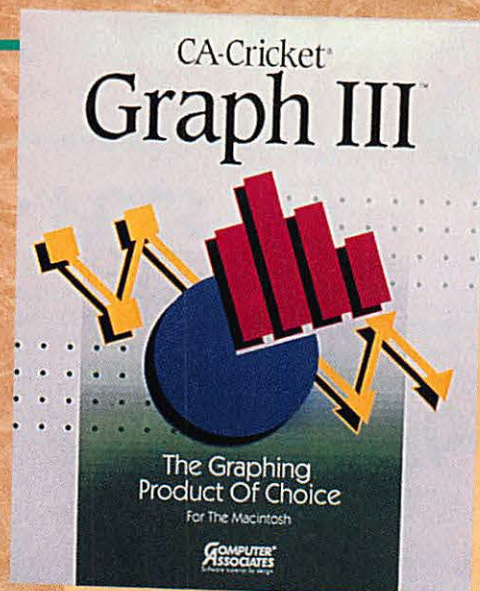
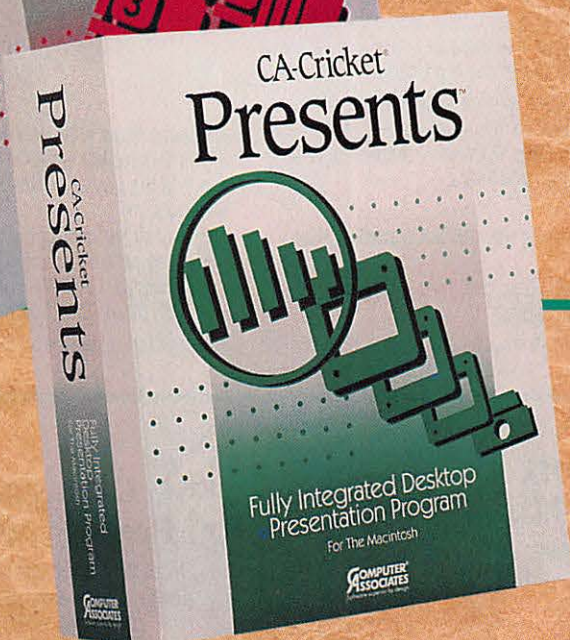
Simply Accounting

Looking for a complete entry-level accounting package? Simply Accounting contains everything you need to get up and running in a flash: a primer that walks you through basic accounting principles, understandable documentation and a complete tutorial.

Computer Associates #04553 ✓

CA-Cricket Presents

CA-Cricket Presents is an easy-to-use, powerful application used to create professional-quality graphic presentations on the Macintosh. It offers all of the tools you need to create a complete presentation with display-quality graphics, speaker's notes and audience handouts. CA-Cricket Presents provides versatile tools to help create a quick presentation for a meeting in ten minutes, or a full-blown professional-quality presentation that will win over even the most critical audience. Computer Associates #01475

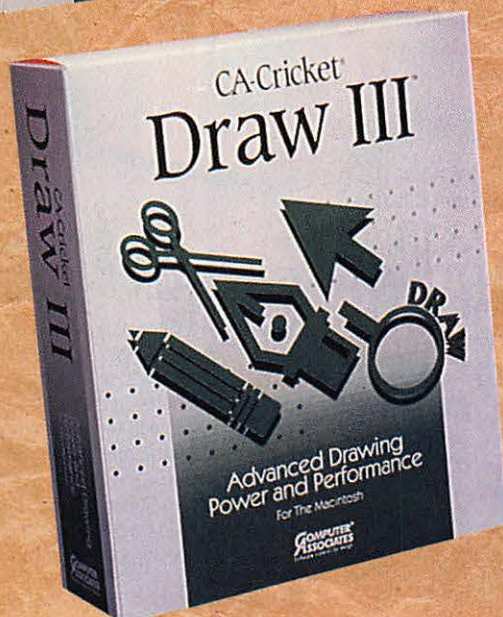


CA-Cricket Draw III

\$198

CA-Cricket Draw is the intuitive, object-oriented drawing program for producing professional-quality graphics on the Mac. It brings high-end drawing power to every level of user with its Bezier-based tool palette, object-to-Bezier path conversion, interactive and flexible color interface, comprehensive text processing and powerful PostScript special effects.

Computer Associates #04414



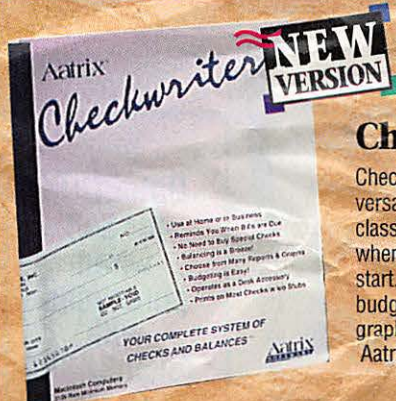
CA-Cricket Graph III \$134

CA-Cricket Graph III makes creating graphs easy! In seconds, you can convert raw data into a complete, professional-looking graph. There are no complex dialogs or commands to learn, no lengthy procedures to follow. Editing graphs is easy too, just double-click a graph component or other object, make your changes in the dialog that appears and view the results immediately!

Computer Associates #00203



MAJOR CORPORATE P.O.'S ACCEPTED

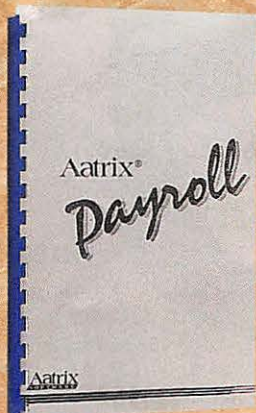


CheckWriter II 4.0

CheckWriter 4.0 is one of the most versatile finance programs in its class! It automatically reminds you when bills are due, and it's easy to start. Version 4.0 offers complete budgeting with over-budget warning, graphing and much more. Aatrix Software #00192

Payroll 4.0

Do your company payroll in a fraction of the time with Payroll 4.0. This easy-to-use program walks you through all the steps! Federal, state and many local taxes are included. The incredible power allows eight customizable deductions, salary or hourly pay and calculation of FUTA, SUTA, Social Security and Medicare. With the built-in reports generator you can print 941s, W-2s and other custom reports. Aatrix Software #01871



\$106

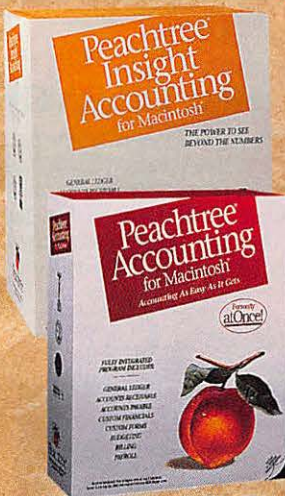
NEW VERSION

\$298

Peachtree Insight Accounting for Macintosh

Peachtree Insight Accounting gives you the power to see beyond the numbers. The package includes: General Ledger, Accounts Receivable, Accounts Payable, Payroll and Inventory. Each module can be used stand-alone or fully integrated with General Ledger. Expert Reports analyze your data and spot potential problems before they happen. Other features include import/export, custom financials, bank reconciliations and more. Peachtree #05745

#02594 Peachtree Accounting for the Mac\$74



MultiLedger

Even though MultiLedger contains many features, it still runs lean and fast. This complete yet straightforward accounting system for small to medium-sized businesses provides General Ledger, AR, AP and Inventory in one easy-to-use program. CheckMark Software #02410



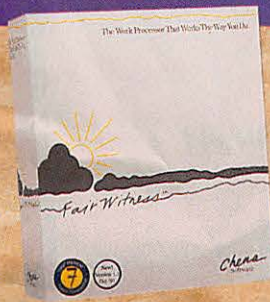
\$234

New Low Price

Fair Witness 1.2

\$178

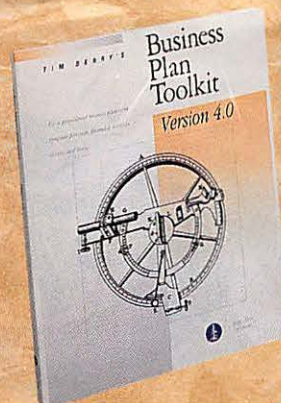
Fair Witness is an ingenious way to integrate the things you do as part of a group or as an individual. It combines the best of an outliner, a database and a project manager into one handy, easy-to-use program. Winner of the 1991 MacUser Editor's Choice Award for Best Organizational tool. Chena Software #00334



\$94

Business Plan Toolkit 4.0

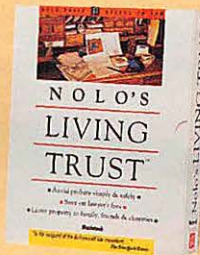
If you are an entrepreneur attempting to raise capital or secure a loan, this package is for you. Business Plan Toolkit is a practical guide for preparing a professional business plan with complete financial analysis, charts, sales forecasts and winning text. A complete sample plan is included on paper and on disk. Palo Alto Software #03910



NOLO's Living Trust

\$43

Avoid the delays and costs of probate. This simple question-and-answer format lets you create, change or revoke your living trust at any time. "A polished product and a great value," says MacWorld. NOLO Press #04720

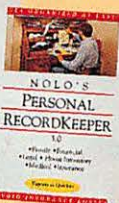
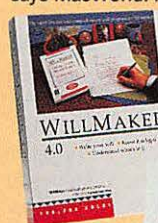


\$34

WillMaker 4.0

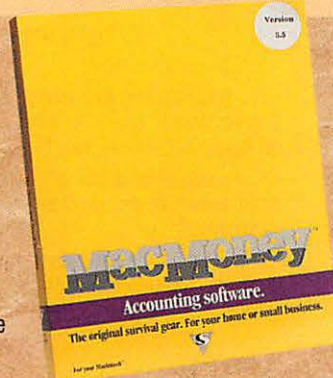
Write or change your will without calling a lawyer. Just answer the questions, and WillMaker constructs your personal will with full legal standing. NOLO Press #00481

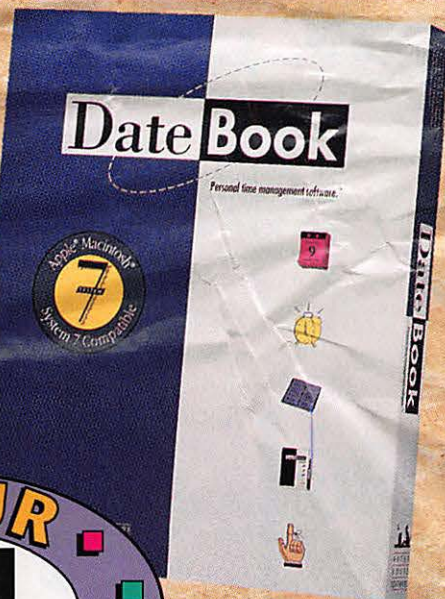
#05212 NOLO's Personal Recordkeeper\$28



MacMoney 3.53

MacMoney is a full double-entry personal and small business bookkeeping system and financial planning tool. MacMoney tracks expenses, bank accounts, credit cards, assets, liabilities, cash and income. You can create up to 250 accounting categories and divide transactions among as many as 8 categories. Survivor Software #01582





Buy
DateBOOK
for \$48
when
purchased
with
TouchBASE!
#05596

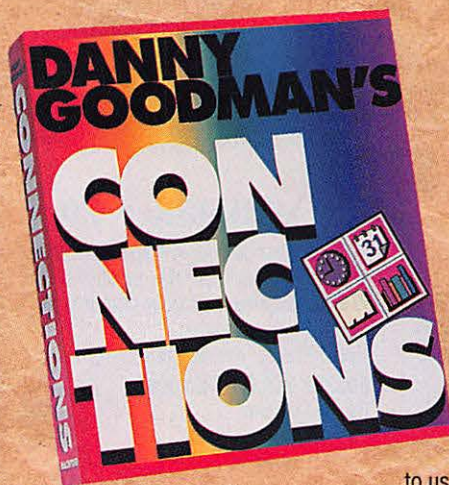


TouchBASE 2.0

TouchBASE 2.0 just might be the most functional piece of Mac software you'll ever purchase. TouchBASE is a database which keeps track of personal and business contacts. It remains handy all the time—no matter what application you're using. The intuitive interface makes it a breeze to learn and use. After Hours Software #03908

DateBOOK

Keep your professional life running smoothly with DateBOOK, the Macintosh personal organizer that enables you to enter and keep track of appointments, schedules and things-to-do. DateBOOK prints monthly, weekly and daily schedules as well as fILOFAX and DayTimer formats. After Hours Software #05209



\$124

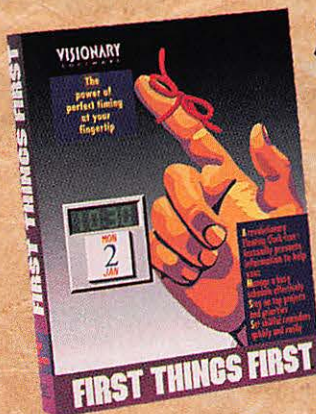
Connections

Manage all your personal information, without the hassle of multiple DAs and utilities. Connections integrates personal and shared calendaring, to-do lists, alarms, telephone directory, contact management and flexible note taking, yet it is remarkably easy

to use. It's ideal for PowerBook users who want to take the office on the road.

- The multiple window format lets you quickly navigate to the information you need. The wide variety of views of your appointments and to-do items includes highlighted deadlines and overdue items.
- The customizable personal libraries let anyone create simple databases that include Connection's searching, sorting and linking capabilities.
- The modular design has been engineered to expand and grow as new software and communications technologies become available.

Concentrix #05382



\$41

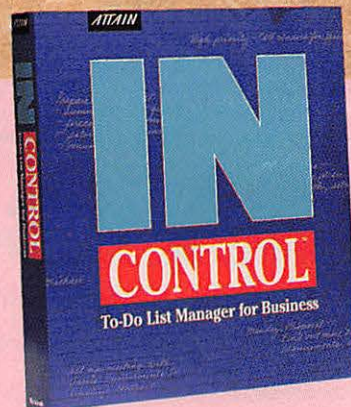
First Things First

The only to-do/reminder program that's instantly available, lightning fast and easy to use. Saves time and energy managing the work you do at your desk. Awarded "Utility of the Year" by MUG News Svc. Visionary Software #04448

\$89

In Control

Get organized fast. Get In Control! MacWEEK calls this to do list manager, "undeniably the product of choice." With it you can track and manage the details of your daily activities: deadlines, priorities, status, staff assignments, anything you want. It's powerful multi-column outline lets you organize and reorganize lists instantly. Macworld says "If you make lists—and mercy on you if you don't—get this program." Attain #04949






↑↑↑↑↑ 1/2



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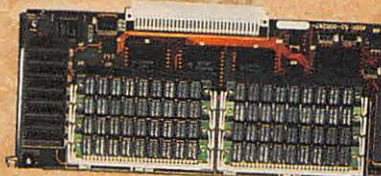
Aldus PageMaker 4.2 with FREE PrePrint

\$494

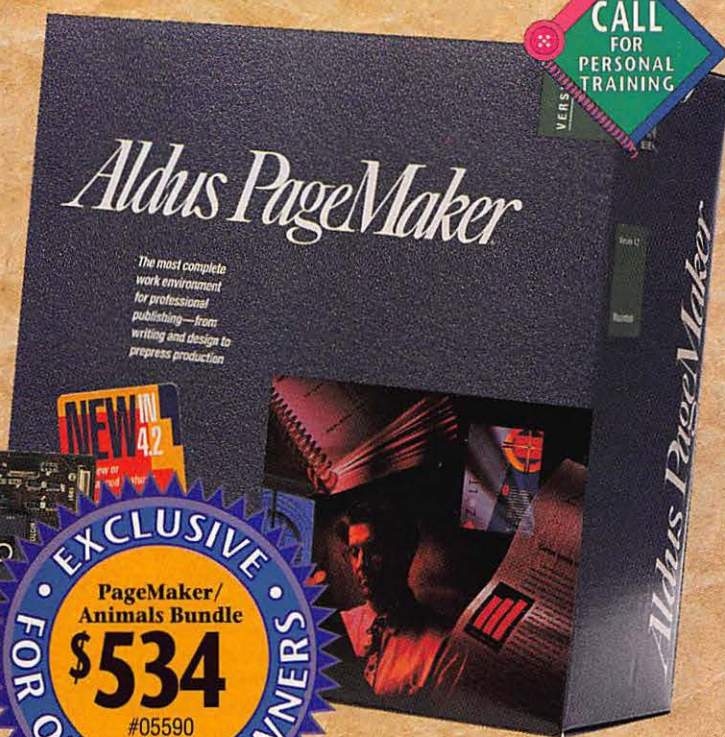
This is it. The one and only PageMaker desktop publishing powerhouse from Aldus. The new System 7 Savvy version 4.2 is packed full of enhancements and features. There's a new hotlink between PageMaker and Aldus Freehand 3.1. By taking advantage of the Apple Events, this hotlink allows you to update placed EPS files without leaving the PageMaker document. PageMaker 4.2 also supports other standard System 7 features such as Subscribe, Balloon Help and TrueType. And Aldus is now shipping PrePrint with PageMaker 4.2. With PrePrint you can produce color separations of any PageMaker publication and enhance and correct TIFF images. Some of the other new enhancements to PageMaker include: a control palette for precise numeric placement and scaling of objects; user-interruptible screen redraw; baseline-to-baseline leading; page sizes up to 42"x42" and much more. Aldus #04573   



When you purchase Aldus PageMaker 4.2 and *Using PageMaker* (#05235) receive the book for only \$19.



- Improved Performance
- Hotlink to Aldus FreeHand 3.1
- System 7 Savvy
- Numerical Control
- Aldus Additions



Personal Press 2.0

\$98

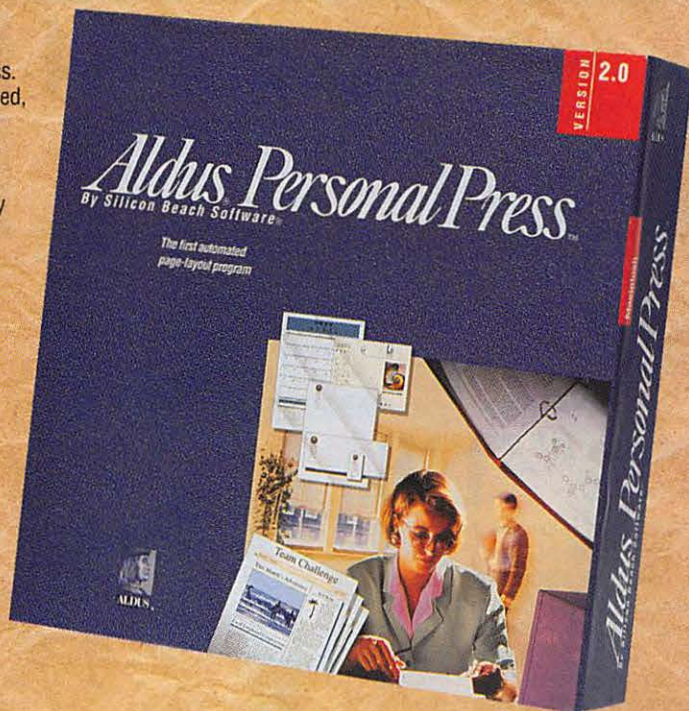
Do you want a powerful desktop publishing package that requires a minimum investment of your time and money? Take a good look at Aldus Personal Press. This easy and effective desktop publishing program has all the features you need, including page layout, full-featured word processor and powerful graphics capabilities—everything you need to produce flyers, newsletters, brochures, reports and manuscripts.

New Aldus Personal Press 2.0 is the only page layout software that intelligently assembles your text and graphics automatically so you look like an expert.

New features include:

- "Intelligent" templates designed by professionals that give you ready-to-print documents in minutes.
- Copy Fitting automatically adjusts your text to fit the designated space.
- AutoFlow automatically adds pages as you need them.
- New System 7 Savvy features help you speed through the production process
- Aldus Additions commands such as automatic drop caps, bullet text and pull-down quotes make it easy to design quickly and accurately.
- Full-featured word processing means you don't have to switch applications every time you want to edit text.
- Plus, you get a generous selection of image controls, drawing tools, free rotation of text and graphics, text wrap, spot color, on-line help and more.

Aldus #05493   



DESKTOP PUBLISHING

1991 WINNER FrameMaker 3.0

The leading document publishing software for creating business and technical documents, FrameMaker 3.0 combines full-featured WYSIWYG word processing, graphics, page layout, equations editing, HyperText and document tools in a single, easy-to-use application. Multilingual documents are easy with 13 international language dictionaries and user interfaces in French, English, German and Swedish. Frame Technology #05800

\$594



FREE
Structural
Publishing
FREE with
FrameMaker
BOOK

\$79 Layouts™ by Postcraft

Punch-up your creativity! Postcraft's award-winning Layouts—219 professionally-designed page-layout templates for PageMaker & Quark. A fascinating variety of camera-ready B&W and color designs—brochures, newsletters, business cards, letterheads, envelopes and business-reply cards. Customize them with your own copy, fonts and graphics. Output to any printer. All templates have crop, registration and fold/score

marks. Also, ask about Postcraft's Stationary and Flyer packs!

Postcraft International

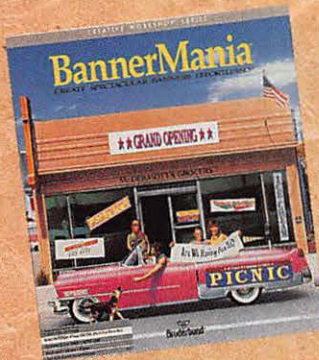
#04162 Layouts-Quark • #04086 Layouts-PageMaker

#05494 Layouts-Stationary Combo Pk

#05495 Layouts-Flyer Combo Pk

\$49

\$49

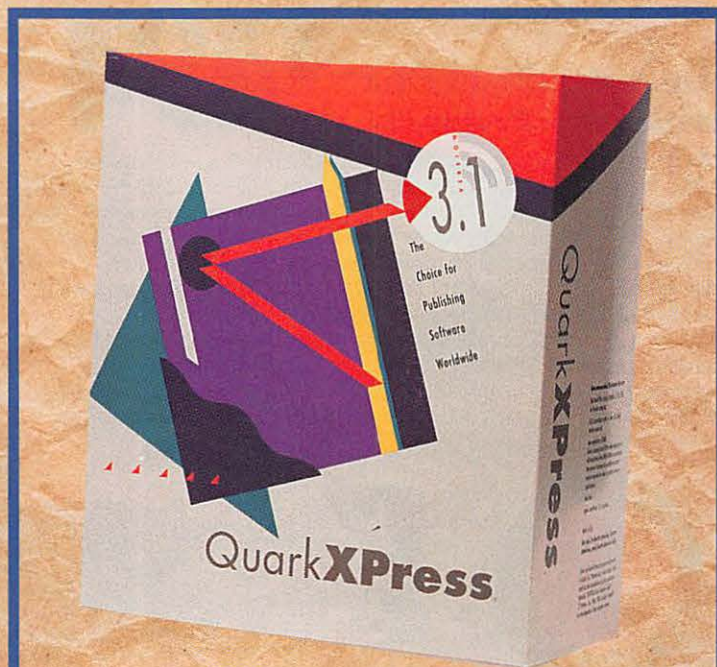
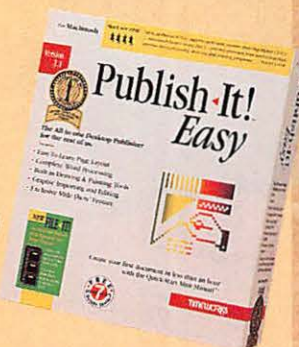


BannerMania! \$34

Get BannerMania! and get your message across, FAST! There's never been a banner maker like it! BannerMania! gives you everything you need to quickly and easily produce spectacular designs—using styles and effects that are available nowhere else. Stretch type, distort shapes, then watch your message print out with perfectly formed characters—and without jaggies! You can also produce traffic-stopping bumper stickers, sensational signs and posters with pizzazz. Broderbund #03970

Publish It! Easy 2.1 \$138

Publish It! Easy is the all-in-one desktop publisher. It combines everything you need—page layout, word processing (complete with thesaurus and spell-checker), built-in drawing and painting tools and a slide-show—into one simple, easy-to-use package. File It! (included) is an advanced database and mail merge program—and it's built right into Publish It! Easy. That means you don't have to leave Easy to create a database, to customize a document or to select, sort, edit or change your data. TimeWorks #04769



QuarkXPress 3.1

\$548

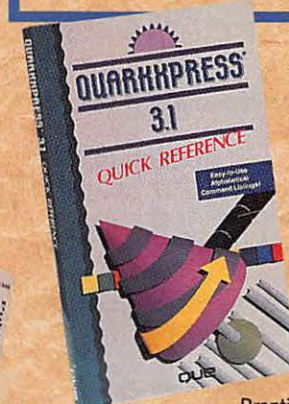
You will find that no matter how you use the new QuarkXPress 3.1, the program's ability to perform virtually all layout and production tasks will make the publishing process easier. A library stores frequently used items, and a pasteboard provides a work area next to each page. You can group text and graphics as a single element, and rotate them incrementally a full 360 degrees. Quark #05236

The Quark 3.1 Advantage-

- Easy To Learn and Use
- Precise Typographical Control
- Professional Color Support Capabilities
- Advanced Text Handling

FREE
QuarkXPress 3.1
Quick Reference Guide
when you purchase
QuarkXPress 3.1 as a Bundle
#05236

BOOK



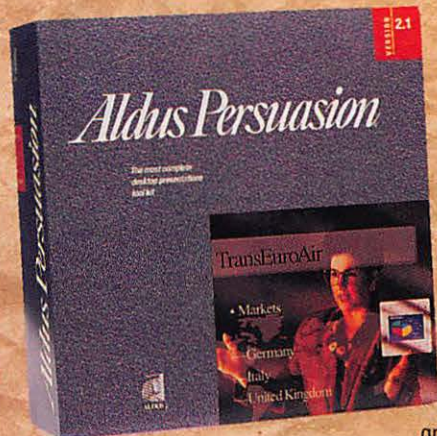
\$9

QuarkXPress Quick Reference Guide

Take control of the learning curve with the QuarkXPress Quick Reference Guide from Prentice Hall. This informative guide takes you inside the Quark environment and teaches you how to tap into the full power of this feature-packed program. Easy-to-follow lessons take you through the layout process step by step. You'll glean special insights from the experts on how to save time and improve the quality of your finished work. If your design time is valuable—you cannot afford to be without the QuarkXPress Quick Reference Guide. Prentice Hall #05097

**OVERNIGHT
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MAJOR CREDIT CARDS ACCEPTED



\$324 Aldus Persuasion 2.1

Need to develop presentation graphics? Let Aldus Persuasion 2.1 do all the work. Just select one of the predefined templates (or create your own) and type your ideas into the outline. Persuasion automatically prepares your slides from the outline. Its Auto Template function enables you to preview, combine or change template designs at will. It provides a variety of predefined charts and graphs (or you can create your own) and automatically generates speakers' notes and handouts. In the slide show mode you can choose from 5 different wipe and dissolve effects. Persuasion includes drivers for the most popular printer and film recorders. New Version 2.1 incorporates powerful new features such as: full System 7 compatibility, a larger template library, a RunTimePlayer that allows finished presentations to run on systems without Persuasion installed, and full cross-compatibility with the PC version. Aldus #00346



NEW PRODUCT \$244 Microsoft PowerPoint 2.1

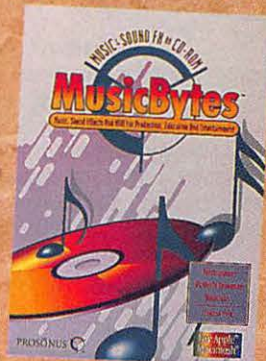
Now you don't have to rely on outside sources to produce slides and overheads for your presentations. Microsoft PowerPoint for the Macintosh allows you to make slides and overheads directly on your Mac! Microsoft #01220

SAVE \$18
when you purchase the PowerPoint 3.0/ MusicBytes Bundle
#05746

Prosonus MusicBytes

\$42

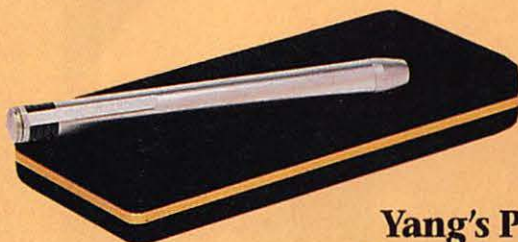
MusicBytes makes your Mac sing! It's one of the hottest collections of clip music and sound effects available. You get 27 original license-free tunes as CD-Audio, 22k and 11k AIFF files and MIDI files. Plus you get over 100 striking Sound FX, from "oh-ohs" to bird whistles to explosions. Prosonus #05626



\$264 More 3.1

slides (overnight through Autograph Service Center) and professional-looking audience handouts. Symantec #04464

More 3.1 is your key to creating professional presentations. Start by organizing your thoughts with the outline. Want to add some graphics? With More 3.1, it's easy to import clip art to illustrate your work or create your own. Add some of More's dazzling charts and graphs and your work comes to life. When you're finished, More 3.1 will print out overhead transparencies, 35mm



\$94

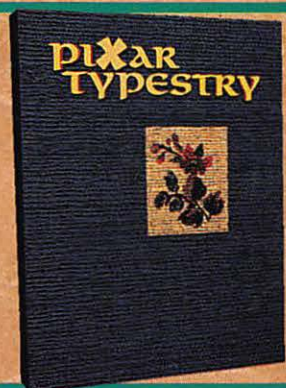
Yang's Platinum Laser Pointer Pen

Laser Pointer is a stylish, low-cost hand-held laser pointing device. It projects a red laser beam up to 300 feet, enabling you to work the room while conducting presentations or training sessions. It's safe, durable, lightweight and uses only 2 AAA batteries (included), and sells for less than half the cost of competing products. Yang's International, Inc. #05522

Pixar Typestry

\$186

With Pixar Typestry you'll create exciting dimensional text from Type 1 and TrueType fonts. Typestry invokes RenderMan magic to transform a simple word into an extraordinary three-dimensional picture. It's ideal for creating images for logos, publishing, design, presentation graphics or multimedia. Pixar #05668



Effects Specialist by Postcraft

\$94

A powerful font-enhancement tool to transform any font into spectacular display type. Create logos, headlines, mastheads, and more! 120 preprogrammed custom effects, each with its own modifiers. Offers kerning, scaling, rotation and skewing. System 7 compatible. Postcraft International #04049





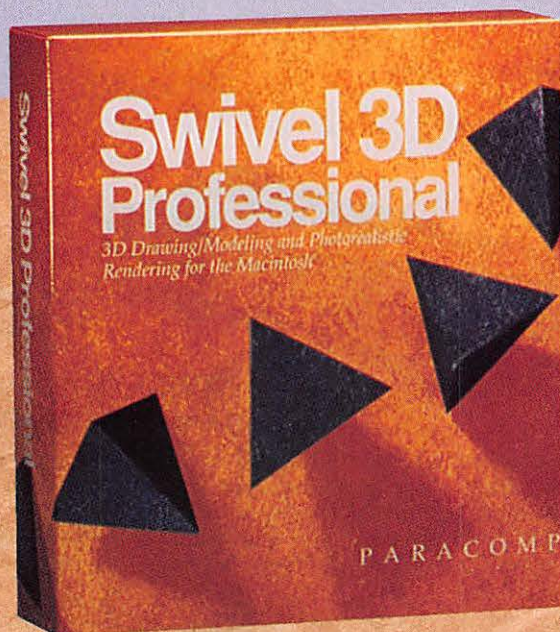
\$998

Professional QuickTime Authoring Kit

Save nearly \$1,000 off the individually-priced items with Macromedia's Professional QuickTime Authoring Kit! You get everything you need to start making QuickTime movies right away. With

Director 3.1 you can

create, combine and synchronize sophisticated graphics, text and animations with audio and video for attention-grabbing digital effects. You can also add full interactivity with buttons, scripts and much more. MacRecorder Sound System Pro allows you to sample, record and edit sound to spice up any multimedia production. ClipMedia gives you an incredible collection of sound effects, animations, digital video sequences and more that you can cut and paste into your own productions! Macromedia #05018



Swivel 3D Pro 1.0 w/MacRenderMan

\$598

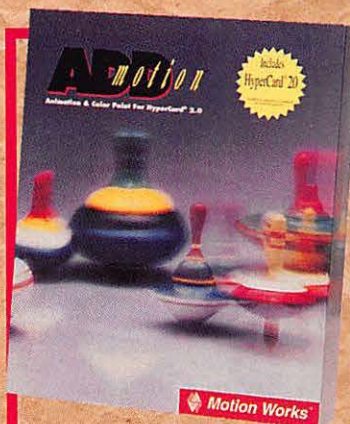
This exciting multi-media production bundle combines two powerful graphics standards: the award-winning Swivel 3D Professional, the standard in 3D modeling on the Macintosh, and MacRenderMan, the Mac standard in photorealistic rendering. Including new features for 3D font creation and MacRenderMan support, Swivel 3D Professional is the 3D color graphics solution for multimedia presentations, animation, illustration, product design and desktop publishing on the Macintosh. It is also ideal for use with MacroMind Three-D for creating final high-quality rendered animation. MacRenderMan creates photorealistic images using shaders which are descriptions of surfaces, color, texture, opacity and reflectivity. Macromedia #04808



\$398

DiVA VideoShop

Create and edit your own high-impact QuickTime movies with DiVA VideoShop. This fun, easy and powerful application lets you record video and audio clips with any QuickTime digitizing board. You can also edit QuickTime movies simply by dragging and dropping Micons (movie icons). Polish your production by adding time-based transitions, overlays, titles and filter effects. DiVA VideoShop provides up to 16 video and audio tracks for movie layout and layering. Plus you get the Image Bank CD Collection, a CD-ROM collection of 300 movies, 70 music scores and a sound effects library, FREE. Cut and paste them into your own productions. DiVA #00602



\$94

ADDmotion II

This seamless multimedia extension for HyperCard brings 24-bit color paint animation and sound editing to HyperCard 2.1. ADDmotion II's ease of use and price make animation and multimedia available to Mac enthusiasts and HyperCard users. Exports QuickTime movies and includes HyperCard 2.1. Motion Works #00194

PROmotion w/FREE PrimeTime CD

\$248

With PROmotion's 24-bit color paint, animation and sound editor you can make QuickTime movies, storyboards and presentations quickly and easily—even if you can't draw. It's the perfect choice for business and artistic professionals. Includes extensive System 7 support, Sony Print to Video and PrimeTime CD-ROM. Motion Works #01039

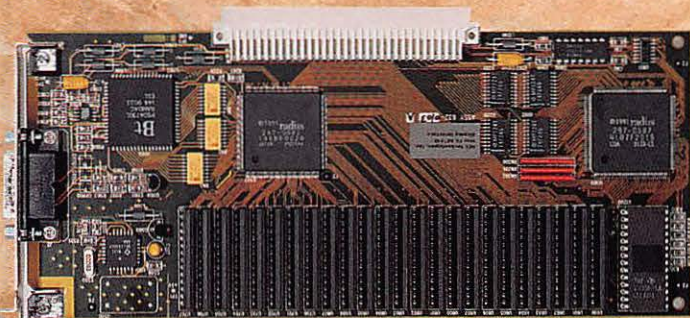
PrimeTime CD

\$64

PrimeTime CD is a collection of media and clips for use with PROmotion and ADDmotion II. The CD includes a media browser containing over 100 actors (in both color and black-and-white), background props and over 120 sound clips covering business, education and entertainment. Motion Works #01038



FAX YOUR ORDER ANYTIME: 1-206-881-3421



PrecisionColor 8X Display Interface

\$798

The PrecisionColor 8X Display Interface represents one of the best display interface values available for your Radius (two-page and color), Apple (Apple Portrait, AppleColor HighRes RGB and two-page displays), NEC (MacSync, 3D, 4D and 5D as well as other VGA displays and compatible multi-frequency monitors). This 8-bit color NuBus interface displays 256 colors (upgradable to 16-bit or 24-bit). Provides multiple resolutions and includes QuickDraw acceleration. Works on any Macintosh NuBus (including Quadra) computer. Radius #04803

#04804 PrecisionColor 24X Display Interface \$1798

- Extremely low cost for 24-bit color
- Includes QuickDraw acceleration
- Supports NuBus block transfer
- Highly integrated design

NEW PRODUCT



\$538

PrecisionColor 24Xp

Dollar for dollar it's tough to beat the PrecisionColor 24XP accelerated display interface card from Radius. This 24-bit solution is perfect for Apple 13" and 16" users. With its low cost and on-board acceleration for 16" displays, no other board comes close. It gives you breath-taking 24-bit color depth (16.7 million colors). It supports the Apple 16" and 13" and other VGA and SVGA color displays and the landscape mode of the Radius Color Pivot/LE. Radius #05496

\$2968

Radius Precision Color Display/20

The Radius PrecisionColor Display/20 is a sophisticated 20" Trinitron® color display for Macintosh and PC computers. The multi-frequency PrecisionColor Display/20 is microprocessor-controlled, connects to a wide array of video interface cards and gives users an unprecedented amount of control over image parameters. PrecisionColor's built-in microprocessor establishes sync with the interface card, provides the best image for the resolution and memorizes any user fine tuning. Radius #04899



#04504 Radius 19" Two-Page Display	\$998
#04505 Radius 21" Two-Page Display	\$1298
#04205 Radius Pivot Display: Monochrome	\$764
# 04206 Radius Pivot Display Color	\$1298

\$2158

VideoVision

Macintosh digital output to regular VHS video tape is here! With this amazing new breakthrough hardware and software technology you can create easily distributable presentations, training tapes, sales seminars, interactive product demonstrations and more. A unique filtering process allows flicker-free 24-bit (16.7 million) color motion video graphics output from computer to videotape. Because VideoVision incorporates technology licensed from Apple, it offers immediate compatibility with all applications that support QuickTime. The VideoVision package consists of a single, digital interface card with built-in video input, video output and 24-bit graphic display capabilities, an external connector panel for video and audio connections and comprehensive software controls. The interface card fits in the NuBus slot of any Macintosh II, IIx, IIcx, IIci, IIfx or Quadra computer. Radius #05650

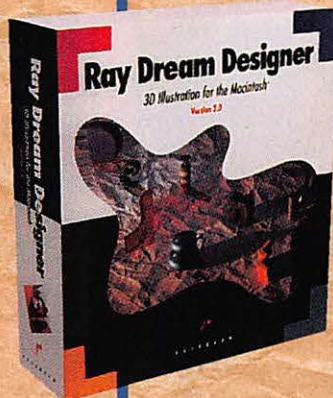




\$249

Fractal Design Painter 1.2

Fractal Design Painter™ lets your Macintosh create original art or embellish scanned images with realistic natural media effects by duplicating traditional tools and textures in 24-bit color. Fractal Design #04460



Designer 2.0

\$619

With Ray Dream Designer, you don't have to settle for flat illustrations. The program's drawing and text tools are virtually the same as those in most 2D illustration programs. The only difference is, now your objects have the realistic look of three dimensions. You can also import paint or scanned images and wrap them around an object or text for instant dimension. What's more, special effects and perspective are all handled automatically. So you can make changes without starting over. Ray Dream #00441

#04150 Jag 1.0\$74

Pantone Process Color Imaging Guide 1000

\$62

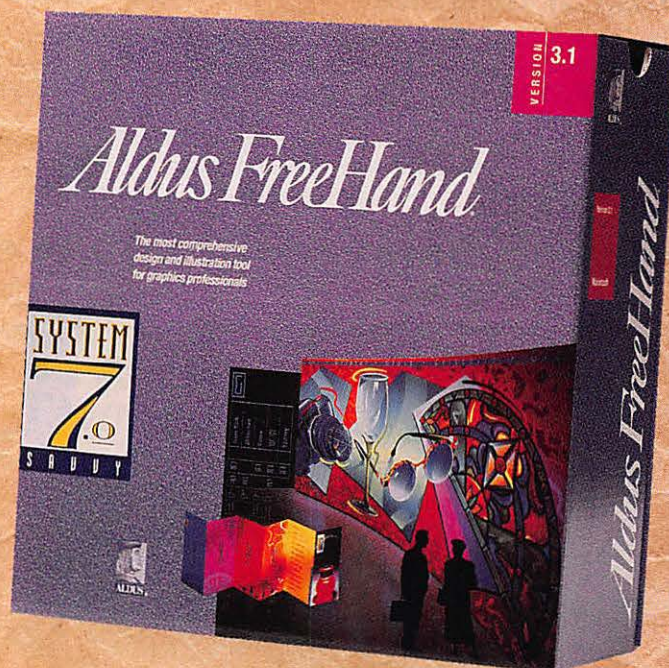
The perfect companion to all PANTONE-licensed software programs, the Color Imaging Guide provides a visual comparison of solid PANTONE color and process (CMYK) simulations as they will appear on the final printed piece. PANTONE #05521



Pantone Process Color System Guide

\$54

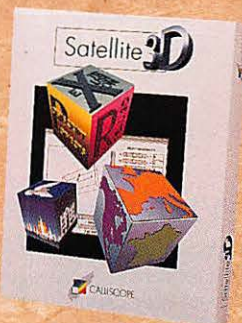
This tool provides you with visual color standards and screen percentage values for over 3,000 new CMYK combinations which are easily specified and reproduced with your favorite graphics program. PANTONE #04056



Satellite 3D

\$128

Produce graphics that will make your company stand out from the crowd with Satellite 3D. With it you can transform any 2D vectorial graphics created in Adobe Illustrator or Aldus Freehand into stunning three-dimensional perspective artwork. Satellite 3D does not merely deform objects to approximate a 3D view; It actually computes the perspective and illumination and saves it as an editable Illustrator or PICT file for illustration, packaging, animation and more. Calliscope #00634



Aldus FreeHand 3.1

\$393

Aldus FreeHand is the easy-to-use professional quality graphics tool that combines an elegant user interface with exceptional depth of function and flexibility. With it you can draw, do page layout, use vivid PANTONE colors and import/export graphics files in a wide variety of popular file formats. It can even be used in combination with pressure-sensitive tables.

- Powerful graphics capabilities let you create the design elements you need.
- Customizable creative interface increases your productivity.
- Built-in flexibility makes it easy to explore new design ideas.
- Superb text handling capabilities help you create the typographic effects you're looking for.
- Precision options ensure exact placement of your design elements.
- Versatile production features give you complete control, from rough draft to finished product.

Aldus #00333



Canvas 3.0

This new version of Canvas 3.0 delivers more than 100 new features, including significantly enhanced text handling, object blending, Bezier font outlines and full support for Deneba's revolutionary open architecture technology. Deneba #00803



KNOWLEDGEABLE SALES ADVISORS

Great Thunder!

ThunderStorm Makes Adobe Photoshop Run Like Lightning!

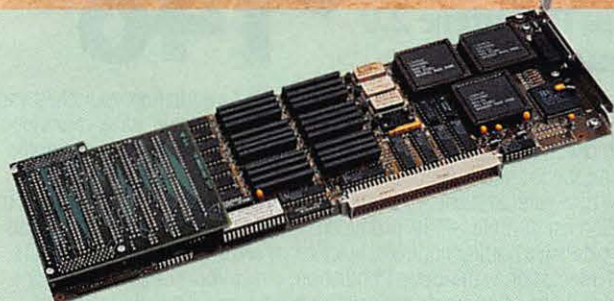
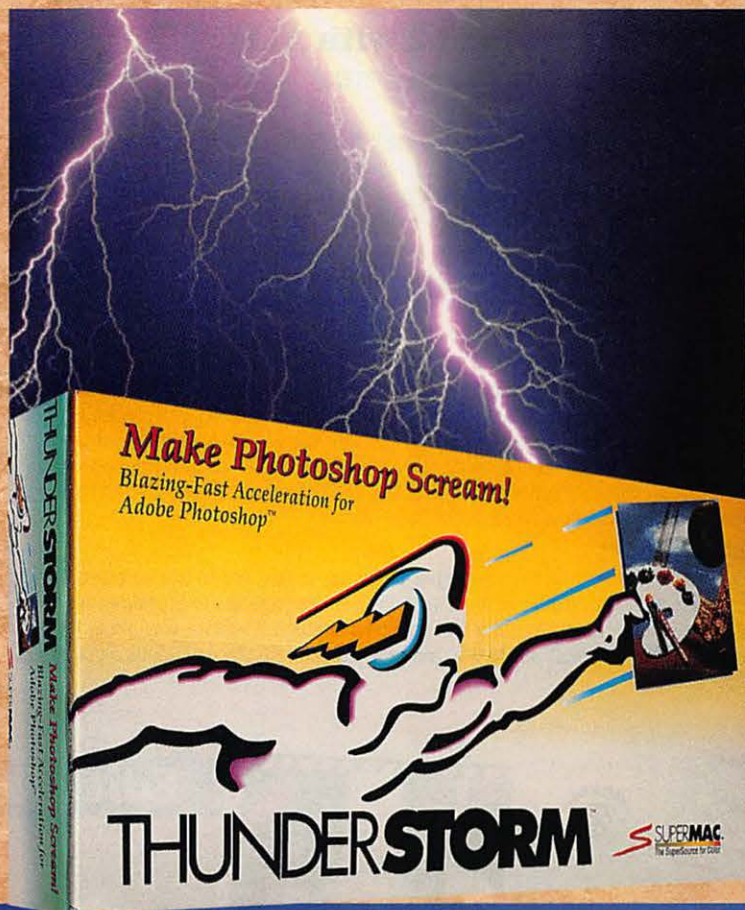
ThunderStorm

\$888

Put some thunder in Adobe Photoshop with ThunderStorm, the accelerator for Adobe Photoshop that provides the industry's fastest performance for crucial Adobe Photoshop filters and functions. This single card solution—based on dual, programmable DSPs that are optimized for Adobe Photoshop filters and functions—works transparently from within Adobe Photoshop to accelerate the functions that color professionals use the most.

- Runs selected filters and functions faster than anything else on the market!
- ThunderStorm produces the same high-quality effects you've come to expect from Adobe Photoshop, but you get them much, much faster!
- ThunderStorm delivers as much as a 1100-percent improvement over Photoshop's native Gaussian Blur, Unsharp Mask, Blur More, Motion Blur, Sharpen Edges and Sharpen More filters, as well as the Resize function!
- ThunderStorm also compresses and decompresses retouched images within Photoshop by as much as 600-percent faster than before!

SuperMac #05797



Spectrum/24 Series III True-Color Board

\$872

If photorealistic artwork is a must for you, so is the Spectrum/24 Series II. They give you the power and functionality you need to move into the exciting realm of ultra-realistic color graphics. With ASIC-accelerated drawing rates, a virtual workspace, instantaneous pan and zoom and flicker-free WYSIWYG resolution, it's ideal for large-scale, true-color graphics applications. Because the QuickDraw graphics engine is an integral part of the Spectrum/24 Series III, it doesn't cost extra. And it doesn't take up an extra slot in your Mac. Only SuperMac gives you large-screen support, 24-bit color and acceleration on the same card!

SuperMac #05117	
#05115 Spectrum 8 LC	\$438
#05116 Spectrum 8 Series III	\$438
#05118 Spectrum 8/24 PDQ si	\$898
#05119 Spectrum 8/24 PDQ	\$898

SuperMatch 20•T Multimode Trinitron® Display

\$2698

The SuperMatch 20•T is an exceptionally versatile display for color professionals who want a desktop view that's right for every project. With easy customization controls, Trinitron technology, and exceptional color rendition,

SuperMatch 20•T is right for every work environment. It works with virtually every small- and large-screen graphics interface on the Mac, PC and other systems. Digital SmartTouch controls make it easy for you to adjust horizontal and vertical sizing and more. Best of all, the SuperMatch 20•T is built to SuperMac's rigorous quality standards.

SuperMac #05125



#05127 SuperMatch 19" Color Display \$1798

Adobe Illustrator 3.2 with ATM \$364

Now Shipping With Adobe Type Manager, FREE!

Once you try Adobe Illustrator software, you'll find it's the single most powerful design tool you've ever owned. That's because Adobe Illustrator is the only program with the precise illustration, extensive text handling, automatic graphing and color separation capabilities professional designers need—all in one package.

Where to begin?

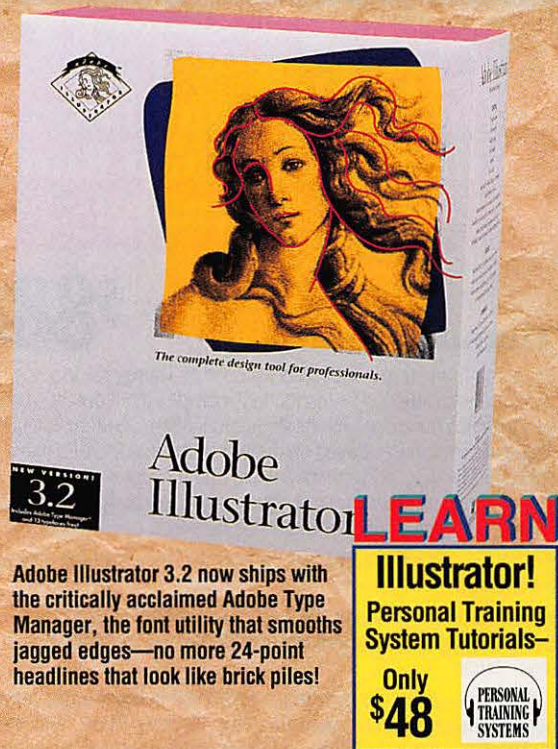
Start by scanning in an existing image, then outline it in seconds with Adobe Illustrator's powerful autotrace tool. Or draw from scratch with the pen or freehand tools—it's as simple as moving your mouse.

Integration and complete control

Now you're ready to integrate text into your artwork. Enter your text directly on-screen or import it from a word-processing program. Adobe Illustrator gives you precise control over kerning, tracking and word and letter spacing. You can even wrap type around a shape and see your alterations on the screen as you work, or flow text from column to column. Add unlimited numbers of characters and styles from any PostScript language Type 1 font, including the entire Adobe Type Library.

Just the Beginning

What has been described here is just the beginning. In fact, Adobe has added so many features to Illustrator that projects ranging from single-page ads to brochures and packages can be completed entirely in Adobe Illustrator 3.2—all the way through color separations. But the best way to discover the depth and elegance of Adobe Illustrator is to give it a try.



Adobe Illustrator 3.2 now ships with the critically acclaimed Adobe Type Manager, the font utility that smooths jagged edges—no more 24-point headlines that look like brick piles!

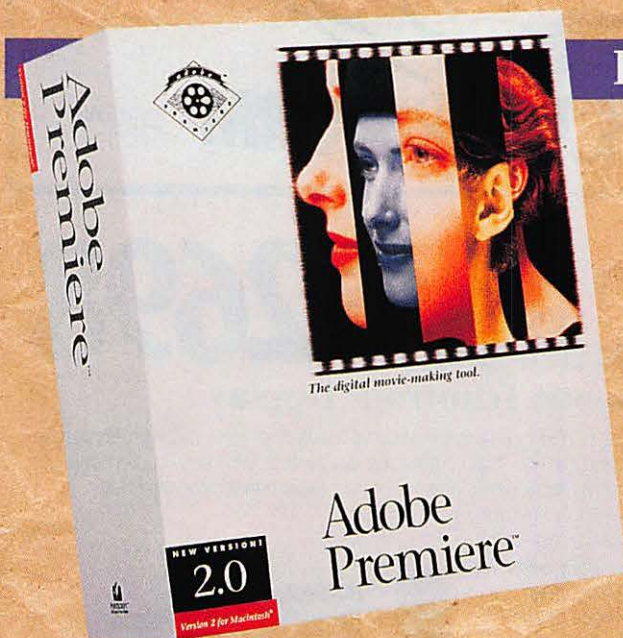
Edit Movies Easily With Premiere!

Adobe Premiere 2.0 Upgrade

\$148

Making a movie with Adobe Premiere is as simple as gathering your clips and arranging them in the order you want them to play. To begin, save your video footage in QuickTime format. Then import it with your other visual and audio files into Adobe Premiere. Utilizes plug-in filters, including those for Photoshop. The new version 2.0 lets you make videotapes on your Mac or export an edit decision list to professional production equipment. Set your imagination free with extensive motion controls, twice as many special effects and filters, improved integration with Adobe Photoshop, direct importing of Illustrator files and much, much more. Improved QuickTime support includes more output options and built-in movie capture that's compatible with any QuickTime digitizing board. Adobe #05702

#04670 Adobe Premiere 2.0 Full Version \$452



Everything you need in one easy-to-use package.

- Intuitive user interface displays video clips in "filmstrip" style
- Multiple windows provide rapid access to any editing function
- Animated icons simplify selection of digital effects
- Video windows enable quick preview of source material, digital effects and assembled video
- Timeline display with variable zoom-in capabilities' single-frame viewing capability
- Push-button controls for stop, rewind, play, fast forward, record and single-stop

Join the QuickTime Revolution

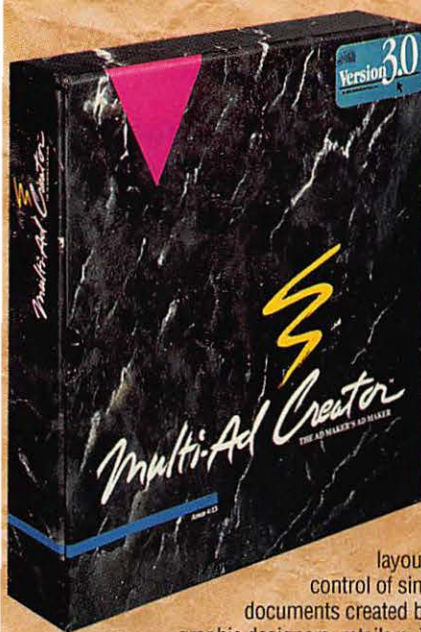
Adobe Premiere, combined with Apple's QuickTime extensions, fulfills the promise of true media integration by delivering the power of digital movies at an affordable price, for a variety of uses:

- Training and education
- Creative development
- Home entertainment
- Video production
- Business presentations
- Merchandising
- Video databases

ADOBE



EDUCATIONAL & INSTITUTIONAL P.O.s ACCEPTED



\$498 Multi-Ad Creator 3.0

Multi-Ad Creator is designed for fast ad layout and precise typographic control of single-page, art-inclusive documents created by newspapers, ad agencies, graphic designers, retailers, Yellow Page advertisers and others. The program's ad makeup capabilities include free rotation of grouped graphics and text, copy fitting, suggested layouts, advanced object drawing and manipulations, controlled duplication of objects, customizable ad layout environments, high-resolution PICT borders and more. Multi-Ad Services, Inc. #04774

EPS Exchange 2.0



\$88

EPS Exchange

EPS Exchange™ 2.0 is an exciting add-on utility which extends the functionality of Aldus FreeHand® 3 by providing the ability to open, as well as generate Adobe Illustrator® 3

and Adobe Illustrator 88® files. You can also export your FreeHand documents for use in Adobe Photoshop™, LetraStudio™ or other programs which support these file formats! Altsys #05036

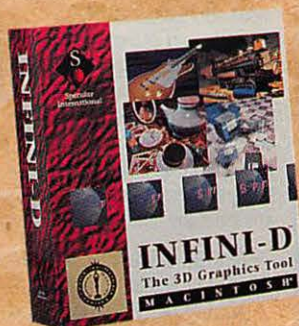
Infini-D 3D Modeler/ Animator/Renderer

\$646

Communicate and sell your ideas with stunning 3D graphics and animations—at a cost that will keep you ahead of the competition. Infini-D is a fully-integrated 3D modeling, rendering and animation package for the Macintosh which allows you to generate photo-realistic images and animations with the easy-to-use interface you've come to expect from your Mac.

Specular International #00815

#05648 ✓ Back Burner\$346



Realize Your True Potential with NEC Monitors & Display Cards



\$778

MultiSync 4FG

Completely redesigned from the inside out, the new MultiSync FG monitors give your Mac brighter, sharper, more accurate images. The 4FG, 5FG and 6FG monitors feature the AccuColor Control System which provides unprecedented color accuracy, nothing short of dazzling. Packed with state-of-the-art extras like FullScan capabilities for 36% more screen display.

NEC #07143

#07144 MultiSync 3FGX 15"\$658

#07399 MultiSync 5FG 17"\$1398

#07182 MultiSync 6FG 21"\$2464



\$1598

Color Display Interface Card: 24-Bit Color

Boost your display productivity, increase your resolution and accelerate your graphics performance with a MacFG Color Display Interface Card. They complement the entire MultiSync FG monitor line and are offered in 8-bit and 24-bit models with QuickDraw acceleration. MacFG cards give you multiple display modes to choose from, including 72dpi WYSIWYG mode, condensed modes and expanded modes. Select the display mode that best fits the application you are using. Switching display modes is as easy as pointing and clicking, without a system reboot. The MacFG 8X and 24X Color Display Interface Cards support the entire Macintosh II family and the new Mac Quadra 700 and 900 systems. NEC #04985

#00578 NEC 8-Bit Interface Card\$798

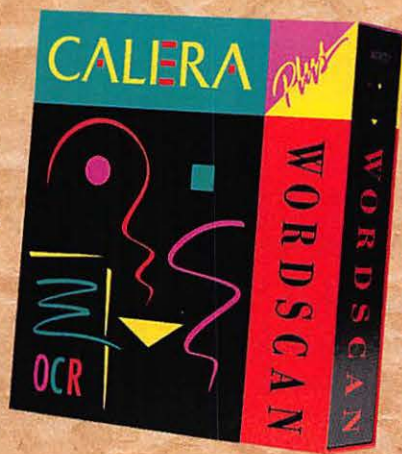
Don't Retype—Scan It!

\$374

WordScan Plus for the Mac

WordScan Plus is one of the most sophisticated OCR systems you can purchase for your Macintosh. It recognizes virtually all business fonts and page layouts and it's capable of capturing everything from bold, italic and underlined fonts to tables, lists and multiple columns. Calera Recognition Systems #04412

- Pop-Up Verifier displays an enlarged original image of any questionable word or character for effortless on-screen proofing.
- Multi-Zone Templates allow you to choose up to 100 specific text or image regions per page.
- AutoClipping automatically finds and clips images and saves them as PICT or TIFF files.
- Style Sheets automatically reformat a document by overriding the existing layout with a new one.



\$278 Ofoto

Now professional-quality gray scale scanning is just a click away. With Autoscan, Ofoto reduces the time-consuming process of scanning, rescanning and editing into one simple step, giving you a crisp, accurate reproduction of your original image on the very first scan, and leaving you more time to exercise your creativity. Light Source #00657

UMAX UC630 Scanner with Photoshop

\$1398

State-of-the-art resolution and sharp, brilliant color, that's what the UMAX UC630 offers. It merges art with 600dpi high-resolution technology, so your pictures, photos and graphics can be reproduced on the screen with remarkable accuracy. The UC630 recognizes up to 16.8 million colors. And it's fast. With its average scanning time of 147 seconds, it's one of the fastest in the industry. It also features: an I/O buffer, image scanning modes, modular design and built-in SCSI interface. UMAX Technologies #00599 (Cover not included)



LightningScan Pro 256

\$488

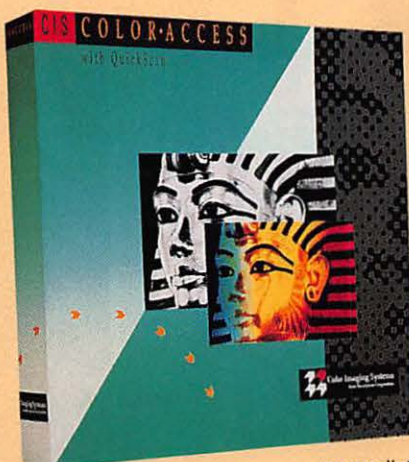
Each quality LightningScan scanner includes ThunderWorks image editing software, the SnapGuide straight scanning system, and READ-IT OCR (a \$295 value). LightningScan Pro 256 is your best choice for high-quality graphics. It's the only hand scanner with 256-level hardware gray scale. Includes Enhance (a \$375 value) for professional image editing. Thunderware #00520

#02212 LightningScan 400 \$358

An excellent choice for all your general scanning needs. Rated the Best hand-held scanner by MacUser and MacWorld.

#00519 LightningScan Compact \$252

Have a Classic, SE/30 or SE/FDHD? LightningScan Compact shares the disk port to make it more affordable and portable. Same image quality as LightningScan 400.



\$574

CIS Color Access

With CIS•ColorAccess, making your own quality color separations on your Mac is finally within your grasp. CIS•ColorAccess increases your creative control by taking the guess work out of four-color separations, giving

you predictable commercial-quality results. ColorAccess has an elegant graphical user interface that makes it easy to use. Using the same skills you already use to mark up color proofs, you have access to the controls that have been used by drum scanner operators for years. And ColorAccess includes built-in productivity features not previously available on the Macintosh. Like background and batch processing, job templates, selective color correction and unsharp masking tools that make images jump off the page. All of these features help you produce superior work on schedule. ColorAccess saves you time and money, because you get your proofs right the first time. Color Imaging Systems #05576



MAJOR CREDIT CARDS ACCEPTED

ScanMan Model 32 Hand-Held Gray Scale Scanner

This latest version of one of the leading scanners for the Macintosh features streamlined hardware and powerful gray scale scanning and editing software. Capture images and words easily with ScanMan Model 32, then use them in ALL your applications, even HyperCard and O.C.R.

- **Advanced editing power:**
32 gray color palette, brightness and contrast controls, resize, rotate, crop.
- **Adjustable parameters:**
Set the scanning resolution from 100 to true 400dpi. You pick the line art and photo settings.

- **Full-page scanning:**
It's easy to merge multiple scans into aligned full-page images.
- **Superior image quality:**
32 gray scale software is included. The sophisticated halftone capability and output controls let you achieve optimal image quality on any screen or printer.
- **Great hardware design:**
Advanced design gives you straight edge, half page scanning width, scanning speed indicator light, extra large scanner window.



ScanMan Model 32 with CatchWord Pro \$378

Team your new ScanMan up with CatchWord Pro intelligent character recognition software and you can capture any printed text. It automatically transforms text scanned with ScanMan into ASCII format for use in all your applications. Add CatchWord Pro to your system, and you'll never have to re-copy, cut and paste or re-key data again! Logitech #00670 1/2

- **Superior compatibility:**
Use text in desktop publishing, word processing, database and other applications.
- **Maximum convenience:**
Pull-down menus and online help make CatchWord Pro very easy to use.
- **Flexible:**
Scan text horizontally or vertically, in columns or full page mode (8-1/2x11, A4, etc.), or import text scanned with other scanners.
- **Get started right away:**
CatchWord Pro uses omnifont technology, so it recognizes almost any standard font with no training from you.

ScanMan Model 32 with Digital Darkroom

\$295

Team your ScanMan Model 32 up with Digital Darkroom from Aldus, and you'll have the power to change your scanned images to fit your needs. Digital Darkroom is gray-scale image processing software for retouching, enhancing, composing and modifying scanned photographs and other bitmapped graphics on the Macintosh. Digital Darkroom offers desktop publishers, photographers and graphic artists the software solution to their image processing needs. Logitech #02561

- **Powerful tools:**
User-defined 1- and 8-bit brushes with interactive brush control, including a scratch pad to test painting effects.
- **Layout environment:**
An enhanced layout environment including custom rulers, full-document crosshairs and a cursor coordinates palette.
- **Power palettes:**
Tear-away, collapsible palettes designed to simplify the main tool palette and conserve on-screen workspace.
- **Image, scanner and printer calibration:**
Optimize image acquisition and output quality by calibrating for individual devices.



Aldus IntelliDraw

\$194

**NEW
PRODUCT**

Aldus IntelliDraw helps you turn "what if..." into reality

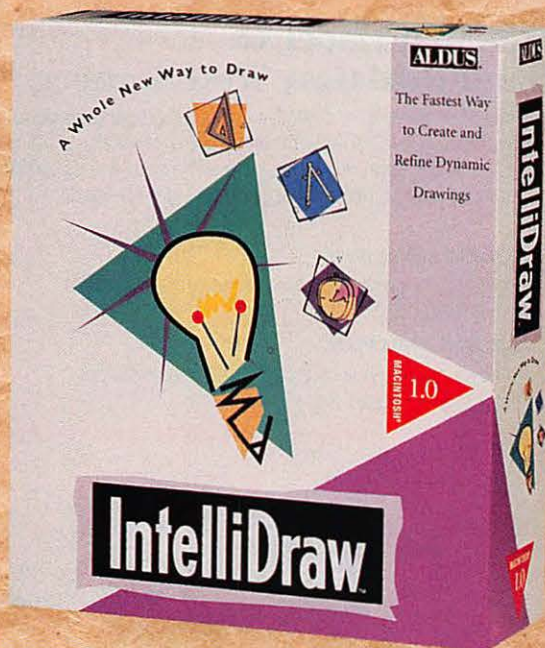
New from Aldus, IntelliDraw is an exciting new type of drawing program that gives you an easy new way to visually experiment, refine and draw your ideas. Innovative smart tools link graphics in your drawing so they respond to changes automatically, making IntelliDraw one of the fastest ways to create dynamic drawings. You'll create visual what-if scenarios with features like intelligent clip art & templates, automatic symmetrical objects and dimension lines. You also get auto-alignment, shape blending, arrows & dashes, powerful text handling capabilities, unlimited layers, color gradients, easy object animation, slide show mode, standard draw tools and more. You can even share files seamlessly between Mac & Windows versions! Aldus #05481 ✓

Use IntelliDraw for:

- | | |
|---------------------------------|---|
| • Business Plans and Reports | • Space and Floor Plans |
| • Product-Concept Proposals | • Easy Animations |
| • Sales Reports | • Forms and Flyers |
| • Presentations | • Charts and Graphs |
| • Market Trends and Projections | • Logos |
| • Scientific Documents | • Maps |
| • Technical Illustrations | • Any Illustration Requiring Speed, Flexibility and Precision |
| • Medical Diagrams | |
| • Architectural Renderings | |

Good-bye to the Platform Barrier

IntelliDraw provides intelligent drawing capabilities to help you work faster and smarter. And "seamless" file sharing between Macintosh and Windows means you can work on, browse through or present your IntelliDraw documents in the environment that's available and convenient. IntelliDraw is the intelligent way to draw. "IntelliDraw rates as a very smart buy." MacWeek.



Making Hard Things Easy

IntelliDraw's advanced technology is all "behind the scenes." What you see when you use the program is a familiar environment—the tools and features work together so naturally, you'll be amazed at how easily and directly you can accomplish one-difficult drawing tasks.

Intelligent Tools For Brilliant Solutions

More than simple shapes on the page, objects in IntelliDraw become "aware" of each other when you define lasting relationships between them. It's easy, using the specialized tools and features: connect objects, align them, distribute them. Then you can experiment or make changes, and they'll behave the way you want. That's Intelligent drawing.

Draw Intelligently with Aldus IntelliDraw

Key Features

- Complete set of standard drawing tools
- "Smart" graphics objects
- Full text capabilities
- Automatic assistance with aligning, sizing and orienting objects
- Create "Symbols" with clones of any graphic
- Symmetricon and Connecticon tools
- Intelligent templates and clip art
- "Sticky" connectors
- Dimension lines
- Cross-platform capabilities
- Powerful shape editing

Benefits

- Perform all draw tasks in a familiar environment
- Easily link elements in your document so that all adjust themselves when you change one
- Flexible text options for labels, organization and flow charts, layout and labeled diagrams
- Create accurate drawings quickly. Alignment and spacing can be automatically maintained
- Edit one master and all clones change automatically (even clip art and bitmaps)
- Quickly produce symmetric shapes and connect new shapes to existing objects
- Use them intact or as a starting point—supplied graphics and templates have pre-defined relationships built-in to save you time.
- Lines stretch, rotate or remain rigid to keep objects connected. Create interactive, dynamic drawings
- Quickly create dimensioned drawings like space plans, technical illustrations, "what if" scenarios
- "Seamless" file sharing between Macintosh and Microsoft Windows
- Create complex shapes faster than any other method. True cutaway, see-through "holes"



FAX YOUR ORDER ANYTIME: 1-206-881-3421



Azimuth 2.1

\$298

Azimuth provides the only non-clip art world-mapping program for the Macintosh. Azimuth 2.1, unlike other clip art mapping programs, lets the graphic artist, cartographer or educator produce dynamic maps of the world or any portion of it from any distance or angle in nine mapping

projections. Azimuth 2.1 functions as

two programs in one: a mapping program that plots

mapping data in latitude/longitude according to user specifications

and an illustration program that functions in inches or centimeters, allowing enhancement of the base map without time-consuming redraws. You can even change scale while text, symbols and line weights remain constant. Comes with 68 fill patterns (32 are editable). Maps may be saved as PICT or EPS files and imported into any program that reads PICT or EPS. Requires a Mac Plus or larger machine and 1MB of RAM. Graphsoft #05962

#04830 Blue Print\$218

#03540 MiniCad+4.0\$594

Save Money with Generation Systems Monitors

14" Color Display \$498

Not only is the Generation Systems 14" Color Display priced far less than Apple's standard 12" monitor, it also offers 56% more work space. It can be used with any Mac model fitted with an appropriate video card, and is specifically designed for the LC, IIsi, IIfx and Quadras. Generation Systems #04588



15" Full-Page Analog Monitor.....\$498

The Generation Systems 15" Full-Page Analog Monitor provides a crisp monochrome view of the entire page. It features an anti-glare screen tilt/swivel base, 80dpi, 75Hz refresh rate and 640x870 resolution. Works with the internal video of the IIsi, IIfx and Quadra in full gray scale. Generation Systems #05287

#05401 15" Full-Page Analog Monitor with Video Card for SE/30\$698

#05402 15" Full-Page Analog Monitor with Video Card for Classic\$698

#05403 15" Full-Page Analog Monitor with Video Card for LC\$698

#05404 15" Full-Page Analog Monitor with Video Card for SE\$698

#05405 15" Full-Page Analog Monitor with Video Card for MacII\$698

Coming Soon! Design Your Own Railroad

Design Your Own Home:

Interiors

Interiors makes it easy to plan the decor of your home or office. Use the drawing tools and supplied patterns to bring your interiors to life! View the room from the top or from four different automatic side-view perspectives.

Abracadata #03611

4.5/5

Landscape

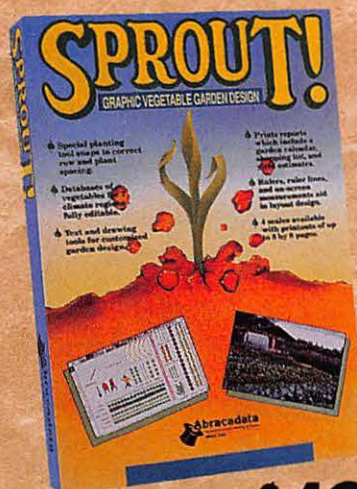
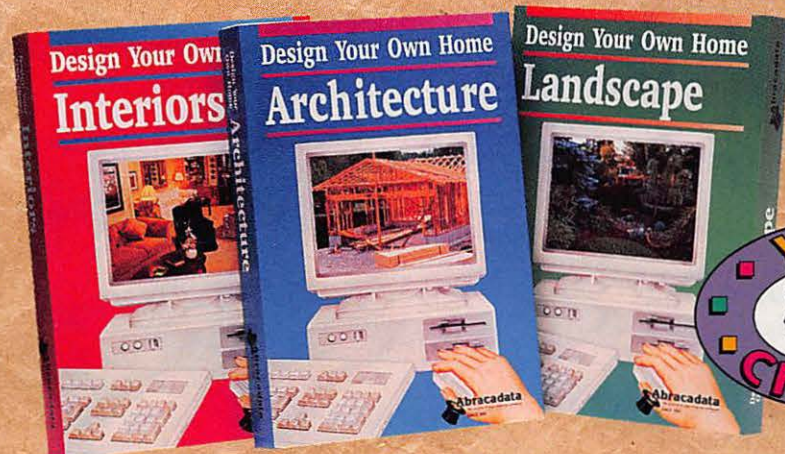
Landscape gives you a variety of drawing tools and patterns to help you plan. Use the built-in object library or draw your own trees, shrubs, etc. then automatically see your design from four different side-view perspectives. Prints plans and plant shopping lists.

Abracadata #03610

Architecture

With Architecture you'll draw your own floor plans, side view building plans and structural details. The program has a unique stud repeater tool which speeds drawing and aids in lumber estimates. The overlay feature allows layering of details such as electrical or plumbing schematics and multiple floors.

Abracadata #03609



\$42

Sprout!

Sprout! is a complete computer planning tool for vegetable gardeners. With it you can easily produce a graphic, scalable garden plan with correct plant and row spacing. In addition, Sprout! contains a fully editable database of vegetables for 7 climate regions. Print out garden layouts, calendars, shopping lists and reports. Abracadata #05085



Special MacZone Font Offer

Exclusively from the MacZone;
 Four Bitstream TrueType
 Font Bundles all in
 one package for only:

#05918

(Regular Price \$312)

\$97

Font Pack 1

- Bitstream Amerigo
roman-italic-bold-bold italic
- **STENCIL™**
- **Windsor**
- **American Text™**

Font Pack 2

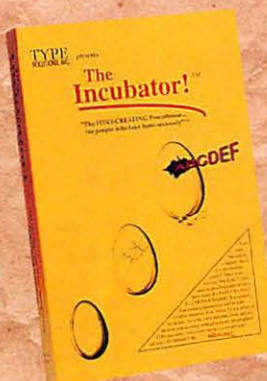
- Bernhard Modern
roman-italic-bold-bold italic
- **Futura Black**
- **EXOTIC DEMI-BOLD**
- *Embassy*

Font Pack 3

- Zapf Hamanist
roman-italic-bold-bold italic
- Baskerville
roman-italic-bold-bold italic
- **Broadway™**
- University Roman
- **Bitstream Cooper Black**
- **Cloister Black**
- **Hobo**

Font Pack 4

- Incised 901
roman-italic-black-compact
- Goudy Old Style
roman-italic-bold-bold italic
- Dom Casual™
- **Handel Gothic™**
- *Kaufmann Bold*
- **Blippo™ Black**
- P.T. Barnum™



\$98

The Incubator!

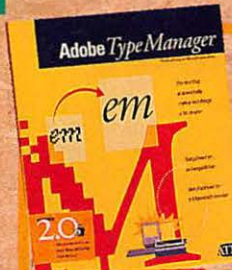
The Incubator! by Type Solutions, Inc. allows you to create fully hinted TrueType fonts quickly and easily from your existing TrueType library. There are four powerful typographical controls—color (light or dark), width, contrast (thick and thin strokes) and slant (right or left). These can be used separately or in tandem to create high quality, unique TrueType typefaces for use in any application. Type Solutions #00490

Buy
 The Incubator!
 and receive any
 Monotype Font
 Pak-FREE!

FontBank Type Companion

Great display typefaces for only 40¢ each! This collection of 250 Type 1 PostScript display typefaces handles most of your needs. Includes traditional, novelty and many other faces! Includes printer and screen fonts. Compatible with all Macintosh programs that support PostScript. FontBank #04986

\$94



Type Manager 2.0

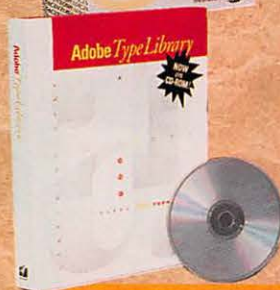
Now, you can adjust kerning and leading on-screen. ATM solves the problems of jagged edges—no more 24-point headlines that look like brick piles. Adobe #03497

\$58

Plus Pack For Type Manager 2.0

With Plus Pack you get 22 high-quality typefaces ideal for all your DTP projects. Adobe #02870

\$108



Type On Call CD-ROM

Adobe has just put software for the world's largest selection of high-quality digital typefaces on a single compact disc. Just pick up the phone and tell Adobe which packages or single typefaces you need. Adobe #03950

\$58



ONE-STOP SOURCE FOR ALL YOUR MAC NEEDS

3G IMAGES WITH Impact!

Accents & Borders 2 NEW!

Accents & Borders 2\$68

Introducing part two of the award-winning Accents & Borders series. Contains frames, borders, tiles, ornaments, symbols and an entire section devoted to holidays! Education, recycling, animals, food and entertainment are just a few of the subjects represented here. Every image is opaque and can be integrated with shapes and type. 3G Graphics #05601

People 1\$94

Select from over 230 graphics of superbly drawn men and women of all races. The categories include: business (some humorous), industry (with 55 occupational symbols), healthcare, fitness, sports and arts & entertainment. 3G Graphics #00421

Accents & Borders 1\$64

Accents & Borders 1 is an essential addition to any clip art library. It gives you hundreds of high-quality borders, designer sets, labels, symbols of food, holidays, people and more. You'll use this one often. 3G Graphics #03192

Graphics & Symbols 1.....\$49

With Graphics & Symbols 1 you get an excellent selection of light-hearted, crisp images in a wide range of styles and subjects including: people, cartoons, food, travel, symbols and frames. 3G Graphics #01617



Business 1\$64

Communicate effectively and powerfully with this extensive collection tailored specifically for business use. The Business 1 collection includes detailed art of computers, occupational and public symbols, people, phrases and more. 3G Graphics #02085



\$67

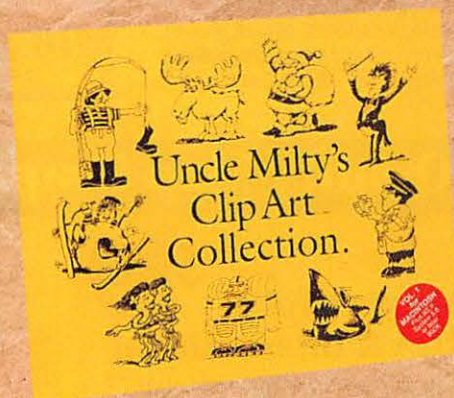
Cliptures Volume 5 • Borders

NEW PRODUCT

Turns dull-looking layouts into eye-catching designs. Includes a huge variety of decorative styles like Art Deco, Art Nouveau, Calligraphic, Certificate, Contemporary, Victorian and more! Ready to use and easy to work with. Each great-looking design is a complete EPS border! Dream Maker Software #05600

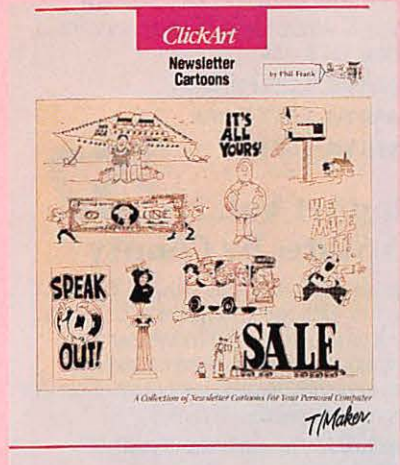
Uncle Milt's ClipArt Collection \$34

Use Uncle Milt's Clip Art and your newsletters, ads, fliers, invitations, brochures, memos, etc. will be more effective and inviting. It includes 100 high-resolution 300dpi illustrations on three disks. All illustrations have been meticulously hand-drawn by Uncle Milt and friends. Use them with PageMaker®, QuarkXPress® and other popular page layout programs that import compressed TIFF. Now compatible with MS Word 5.0®. Digital fun for kids and adults! Uncle Milt #04273



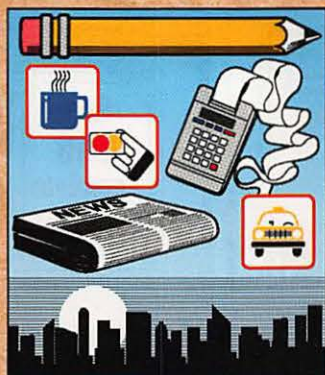
Newsletter Cartoons \$34

ClickArt Newsletter Cartoons includes 100 fun and imaginative cartoons by award-winning artist Phil Frank. This is an ideal collection for enhancing reports, invitations, newsletters, memos, letters, fliers and many other types of publications. The image categories include: politics, travel, education, announcements, ecology, money and leisure. T/Maker #04900



Volume 1: \$67 Business Images

Volume 1: Business Images gives you 148 business illustrations, including a wide selection of male and female executives and a variety of tantalizing business cartoons, graphics and symbols. Dream Maker #03998



Volume 2: \$67 Business Images 2

Volume 2: Business Images gives you another 206 powerful business illustrations of men and women at work, plus people silhouettes, business cartoons, aircraft, money, telephones and lots of computers. Dream Maker #03999



Volume 3: \$67 Sports

Volume 3: Sports puts 228 fantastic sports images at your fingertips. Includes lots of men and women athletes and a rich collection of other outstanding sports graphics, symbols, icons and more. Dream Maker #04000



Volume 4: \$67 World Flags

Volume 4: World Flags contains exquisitely detailed national and civil flag illustrations from all the independent and dependent countries of the world, plus various international, organization and code flags. Dream Maker #04282

Quality Map Graphics for your Designs and Presentations

MapArt Vol.1: \$89 USA & International

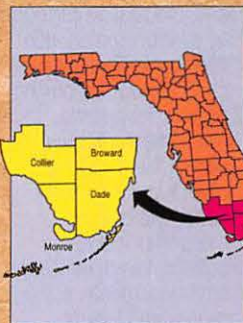
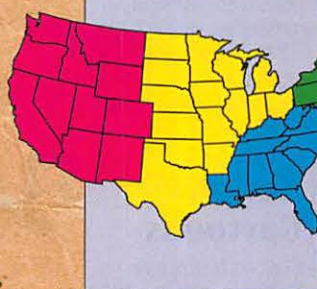
A comprehensive set of 4 world maps, 14 world regions and continents, and 29 countries with states, provinces, country names, major cities and water bodies: Australia, Austria, BeNeLux, Brazil, Canada, China, Denmark, Finland, France, Germany, Greece, India, Ireland, Israel, Italy, Japan, Mexico, New Zealand, Norway, Portugal, Russia, S. Africa, Spain, Sweden, Switzerland, Ukraine, UK & USA.

MapArt Vol. 1 EPS Format
MapArt Vol. 1 PICT Format
MapArt Vol. 1 CD-ROM

MapArt Vol. 2: \$52 US States by County

Maps of the 50 US States showing all 3000+ counties. Each county is drawn as a separate object so you can customize the maps with Illustrator or FreeHand. Great for showing sales territories, creating inset maps or custom regions. Includes county names.

Requires: Any program that imports EPS images.



Import maps directly into a DTP or presentation program, or use your favorite graphics program to create customized maps! Individual features drawn as separate objects, so you can select objects, add fill patterns, drop shadows, graphics, text or numbers. MicroMaps Software

MapArt Vol. 3: \$24 Global Perspectives

Eighteen maps of the globe, each one centered over a different area of the earth. Drop one of these images into your designs to add graphic impact! Features country boundaries and latitude/longitude lines.

Requires: Any program that imports EPS images.

MapArt Vol.4: \$14 Metro Areas - USA

Maps of 25 US metro areas with major roads, coastlines, city boundaries, parks, airports, universities & stadiums. Includes:

Atlanta, Boston, Chicago, Cleveland, Columbus, Dallas/Ft. Worth, Denver, Detroit, Honolulu, Houston, Indianapolis, Kansas City, LA, Miami, Minneapolis, New Orleans, NY, Philadelphia, Phoenix, Pittsburgh, San Diego, San Francisco, Seattle, St. Louis, Washington, DC.

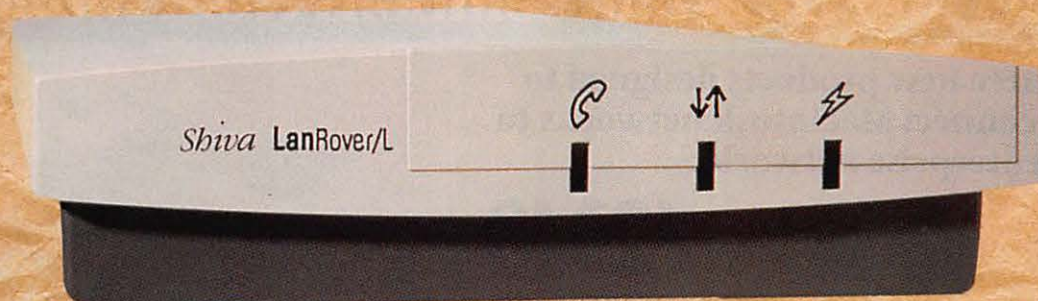
Requires: Any program that imports EPS images.

#05645 KidMaps \$14



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Network More Effectively with Shiva



\$598

LanRover™/L

LanRover/L is a stand-alone communications server for Apple Computer's AppleTalk Remote Access. It allows PowerBook users and users of desktop Macintoshes running AppleTalk Remote Access software to call and connect to an AppleTalk network over standard telephone lines. Once dialed into LanRover/L, you can take advantage of network services—for example, e-mail, databases and groupware—as if you were directly connected to the network. LanRover/L also provides network Macintoshes with a shared modem for dial-out to remote information services, bulletin boards or hosts. LanRover/L offers network administrators several unique advantages for managing dial-in and dial-out. The package includes Shiva Net Manager which provides easy centralized management and security features. LanRover/L is a reliable, dedicated device that you can install in a location where there is no risk of accidental shut-off or tampering.

Shiva #05128 ✓✓



\$338

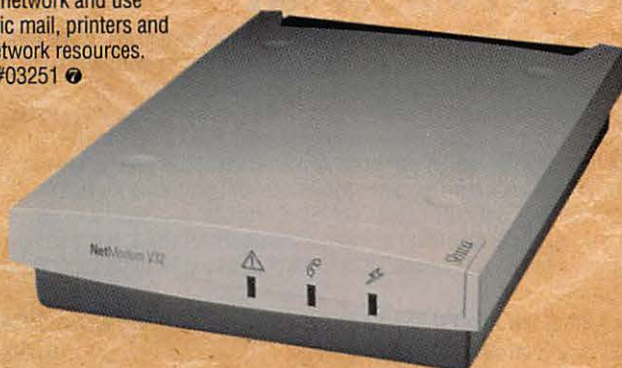
NetModem V2400

NetModem V2400 is a communications device designed to meet two LAN communications needs. It allows remote Macintosh users to dial in and have access to network services, and it lets Macintoshes dial out to remote information services or hosts. NetModem V2400 consists of a Hayes-compatible modem with V.22 and V.22bis support and a built-in LocalTalk interface. NetModem V2400 supports Macintosh computers and PCs on LocalTalk networks. It connects directly to the network without dedicated computers and can be shared by an unlimited number of users, one user at a time. Shiva #01615 ✓✓

NetModem V.32 9600

The NetModem V.32 is a 9600bps modem that is designed to be shared over AppleTalk. The NetModem also includes dial-in network access software which allows a remote Mac or PC to dial into the network and use electronic mail, printers and other network resources. Shiva #03251 ✓

\$1038



Check Out These Shiva Solutions

#01405 Shiva NetBridge	✓\$408
#01406 Shiva NetSerial	✓\$274
#02542 Shiva TeleBridge	✓\$408
#02985 Shiva EtherGate	✓\$1294
#04038 Shiva Fast Path V (thick/thin)	✓\$1886
#04129 Shiva NetModem/E 10Base-T	✓\$1484
#04491 Shiva NetModem/E Thin	✓\$1484
#04758 Shiva NetModem/E Thick	✓\$1484
#04759 Shiva NetModem/E AUI	✓\$1484

Get Your Network Together With Complete Ethernet and LocalTalk Solutions From Farallon

Introducing three new products designed to integrate and connect Macintosh networks to Ethernet and enterprise networks.



\$288

10T Starlet 9

Finally, an affordable 10Base-T solution for connecting workgroups or expanding intelligent hubs. Use the 9-port Starlet to quickly create a 10Base-T workgroup network. Or connect it to a 10Base-T port on an intelligent hub (such as the StarController EN) to add more nodes and one BNC port to connect multiple Starlet mini-hubs along a thinnet backbone. It also features LEDs for link status (per port), traffic (per port) power and collisions. Farallon #05693

\$2348

StarRouter

Now LocalTalk users can have full access to Ethernet. The StarRouter combines AppleTalk routing and a TCP/IP gateway with LocalTalk repeating. The StarRouter hub's high-performance AppleTalk routing includes translation between AppleTalk Phase 1 and Phase 2. Its AppleTalk-TCP/IP gateway gives LocalTalk users access to UNIX hosts, PCs and other resources on Ethernet. The StarRouter also features a 12-port LocalTalk repeater built on patented StarController technology. LocalTalk nodes are connected with unshielded twisted-pair cabling (UTP) using the PhoneNET structured cabling system. Farallon #05939



NEW PRODUCT

NEW PRODUCT

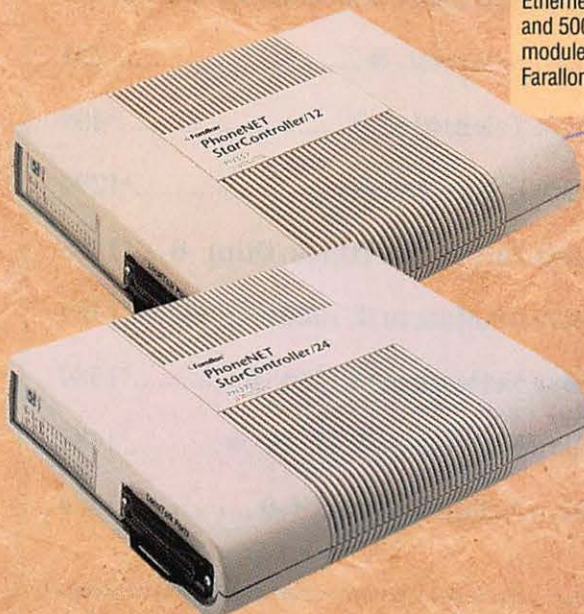
Concentrator

\$2128

The Farallon multiple-bus Concentrator integrates Ethernet, LocalTalk and routing to create larger, more reliable Macintosh networks. The Concentrator can accommodate up to ten Farallon networking hubs and routers, creating up to ten independent star networks. Existing Farallon LocalTalk and Ethernet StarController repeating hubs (Series 300 and 500) are easily converted to Concentrator modules. Includes StarCommand software. Farallon #05940



Farallon®



PhoneNET StarController PN 357 12-Port/PN 377 24-Port

The PhoneNET StarController hub amplifies and repeats LocalTalk signals to network devices. Available in 12-port and 24-port models, the StarController permits you to manage multiple StarController hubs over your network. The StarController automatically turns ports off and on to isolate jamming signals; LEDs provide traffic information at a glance. Use StarCommand network management software (included) to control hub settings, gather statistics, text line conditions and record Chooser names by port. StarCommand alerts you to network problems for both Ethernet and LocalTalk StarController hubs. Each StarController package includes StarCommand software, a wall mounting bracket, a management cable, terminating resistors and a power adapter. A PhoneNET StarController wiring kit (sold separately) is also required. Farallon

#04738 PhoneNET StarController PN 357 12-Port \$924
#04739 PhoneNET StarController PN 377 24-Port \$1298



WE SHIP WORLDWIDE- 1-206-883-3088

Choose Farallon: the Better Ethernet Solution

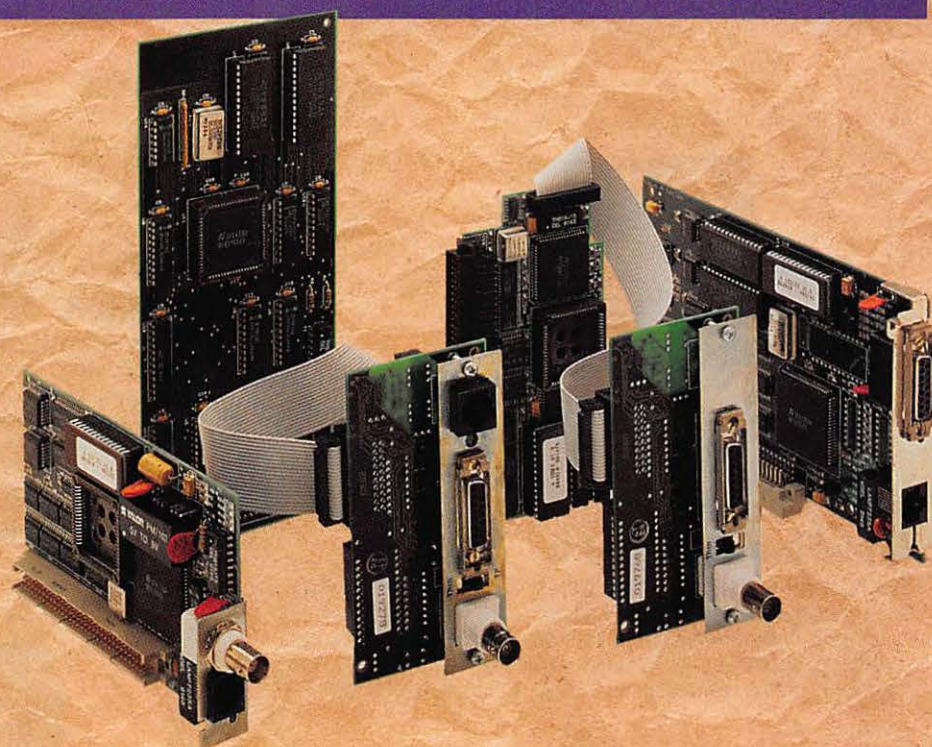
EtherMac Cards

There's an affordable EtherMac Card for any Mac that has an expansion slot. You can choose from three standard cable types: 10Base-T, thicknet and thinnet. Farallon even makes EtherMac cards that support all three media interfaces on a single board. And those aren't the only extras available; There are EtherMac cards with 64K RAM for servers or A/AUX, and cards with FPU's for math-intensive applications.

They're manufactured using surface-mount technology and highly integrated controller chips for maximum performance and reliability.

EtherMac cards support the Macintosh II series (NuBus), IIsi, SE/30, SE and LC. Cards for the Macintosh LC and IIsi are available with the Motorola 68882 math co-processor installed.

EtherMac cards are fully compatible with System 7, and with the Apple Ethernet installer. When installed under System 7, no separate installer disk is required. All EtherMac cards are covered with Farallon's legendary 5-year warranty.



**NEW
PRODUCT**

Introducing Farallon's Expanded Ethernet Line

\$288

Ether10-T Starlet

Finally, an affordable 10Base-T solution for connecting workgroups or expanding intelligent hubs. Use the

9-port Starlet to quickly create a 10Base-T workgroup network. Or connect it to a 10Base-T port on an intelligent hub (such as the StarController EN) to add more nodes and one

BNC port to connect multiple Starlet mini-hubs along a thinnet backbone. It also features LEDs for link status (per port), traffic (per port) power and collisions. Farallon #05693

**NEW
LOWER
PRICE**

\$1268

StarController EN

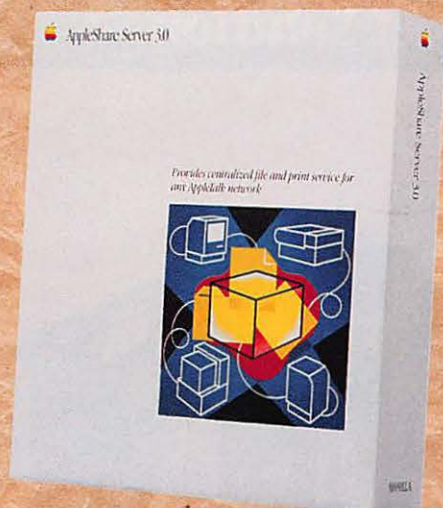
The 12-port StarController EN is an intelligent, concentrator-ready 10Base-T hub that includes powerful

management software. The StarController EN features an additional AUI port, so multiple hubs can be linked along a thinnet backbone. It can also be used as a module in the Farallon Concentrator, for complete integration of LocalTalk, Ethernet and routing. StarCommand management software lets you view traffic information, keep track of where users are and control 10Base-T ports. Farallon #05692

Farallon®

Farallon EtherMac cards provide a choice of Ethernet interfaces for any Macintosh. They're available with connections on-board for up to 3 different media—10 Base-T, ThickNet and ThinNet.

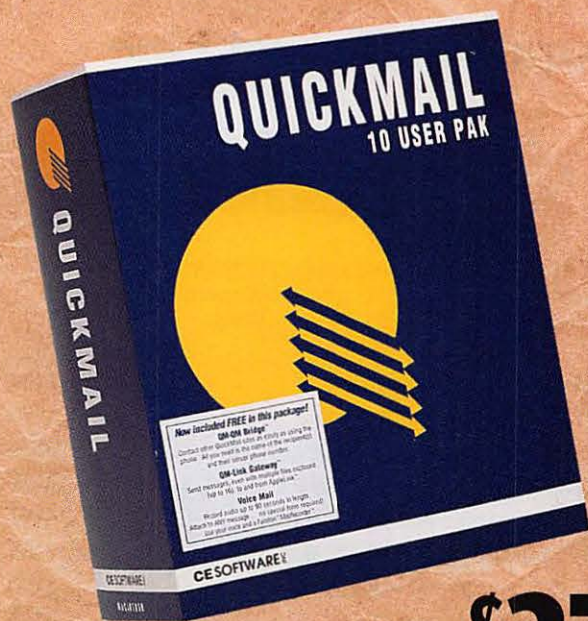
#00676 Farallon EtherMac II-TN	✓	\$158
#00677 Farallon EtherMac II-10T	✓	\$158
#00678 Farallon EtherMac II-C	✓	\$208
#00679 Farallon EtherMac LC-TN	✓	\$158
#00680 Farallon EtherMac LC-TN+FPU	✓	\$248
#00681 Farallon EtherMac LC-10T	✓	\$158
#00682 Farallon EtherMac LC-10T+FPU	✓	\$248
#00683 Farallon EtherMac LC-C	✓	\$208
#00684 Farallon EtherMac LC-C+FPU	✓	\$298
#00685 Farallon EtherMac 30i-TN	✓	\$188
#00686 Farallon EtherMac 30i-TN+FPU	✓	\$278
#00691 Farallon EtherMac 30i-10T	✓	\$188
#00692 Farallon EtherMac 30i-10T+FPU	✓	\$278
#00693 Farallon EtherMac 30i-C	✓	\$238
#00695 Farallon EtherMac 30i-C+FPU	✓	\$328
#00696 Farallon EtherMac SE-C	✓	\$208



\$998

AppleShare Server 3.0

AppleShare Server 3.0 is the premiere file sharing software for the Mac. This new version meets the security, performance and multi-tasking requirements of larger workgroups and departments. It provides access to centralized shared storage for up to 120 concurrent users and queued access for up to five network printers. Apple Computer Corp. #05475



\$374

QuickMail 2.5 (10 User)

With QuickMail 2.5, the days of missed messages, expensive overnight services and "while-you-were-out" slips are all over. It connects Mac and PC users on AppleTalk, NetWare, Banyan, 3Com, LAN Manager and other networks. CE Software #04169

#04169 QuickMail 2.5 (5 User)\$248

#04171 QuickMail 2.5 (50 User)\$1548

Asanté has a Card for Every Mac

10T Hub-8

With the Asanté 10T Hub-8, network managers can connect local area networks with inexpensive twisted-pair telephone wire instead of expensive coaxial cable. Supports the IEEE specifications for 10Base-T Ethernet. Asanté #00404

\$258

#00348 10T Hub-10\$528



\$164

MacCon+ 30iE

The MacCon+ 30iE is a 32-bit Ethernet card that easily plugs into a Mac IIx or SE/30. This card

includes a PDS pass-thru slot for connecting additional expansion cards, and an FPU socket for adding an optional math co-processor. Like all Asanté products, the MacCon+ 30iE is 100% tested before shipping and is backed by FREE technical support. 5-year warranty. Asanté #00020

#03646 MacCon & 30iE\$164

#00511 MacCon3 Ethernet Card\$218

**NEW!
FOR THE
POWERBOOK**

\$329

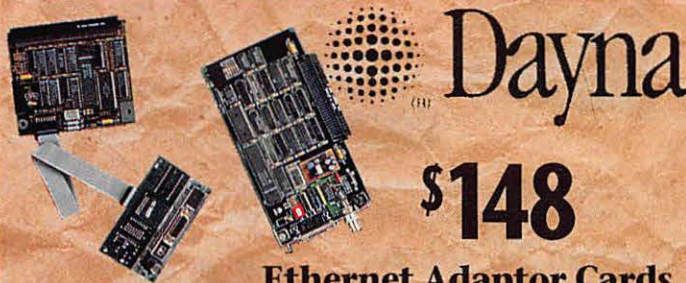
EN/SC PB

The Asanté EN/SC PB is an external SCSI adapter for connecting the new Macintosh PowerBook computers to Ethernet networks. The EN/SC PB includes ports for all three types of Ethernet media—thick, thin and 10Base-T. Asanté #00847



MAJOR CORPORATE P.O.'S ACCEPTED

The Complete Ethernet Solution



Dayna

\$148

Ethernet Adaptor Cards

Based on premium Ethernet controller chips from National Semiconductor, DaynaPORT cards are the fastest in their class. They come with diagnostic software and an easy installer that automatically selects the driver for the Macintosh model and version of system software you are running. Call The Mac Zone for a complete selection of Dayna Ethernet Adaptor Cards. Dayna Communications, Inc. #05903

\$438

EtherPrint Plus

EtherPrint Plus goes beyond the basic EtherPrint capabilities, letting you connect multiple, LocalTalk devices directly to an Ethernet cable system. Not limited to printers EtherPrint Plus supports up to four LocalTalk devices of any sort (except routers). Dayna Communications, Inc. #00321



EtherPrint

EtherPrint offers an easy "plug and print" Ethernet connection for LocalTalk printers, at a much lower cost than a hardware router. Provides direct Ethernet connection for up to four LocalTalk devices of any sort. All models support AppleTalk Phase 1 and 2 protocols over thick, thin and 10Base-T or fiber-optic Ethernet cable systems. Dayna Communications, Inc. #03546

\$348

DaynaPORT SCSI/Link

\$294

DaynaPORT SCSI/Link is a small Ethernet connector box with a compact, portable design, ideal for Macintosh PowerBooks and portables. Both 10Base-T and thin-Ethernet cable systems are supported. Dayna Communications, Inc. #05188

#05189 DaynaPort SCSI/Link T PB\$294
#05190 DaynaPort SCSI/Link 3 PB\$338

NetMounter

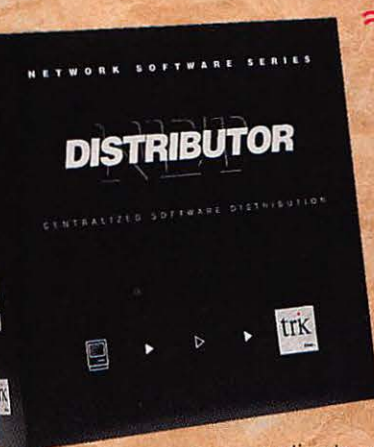
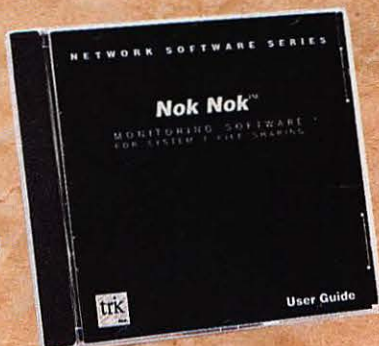
With NetMounter, you can easily access NetWare from your Mac. This innovative utility lets a Macintosh log into any NetWare file server, with no need for NetWare for Macintosh. Once logged in, you can copy files to and from the server, and edit MS-DOS files with Macintosh applications. Dayna Communications, Inc. #05184 (single user)

#05185 NetMounter 5-User\$224
#05186 NetMounter 10-User\$334

Nok Nok

\$36

Keep track of who is attempting to connect to your Mac via System 7 file sharing. Nok Nok senses when someone is logging on, reads the user and machine identity and lets you know who it is. Never again will you discover that anonymous "guests" have logged onto your system. Trik #05042



NEW VERSION

\$488

NetDistributor Pro

If you're looking for the ultimate control over all your software updating, then you need to have NetDistributor Pro. It installs software updates, including applications, fonts and desk accessories, anywhere and

anytime to networked Macintoshes across LocalTalk, EtherTalk, TokenTalk and WAN links. Features include powerful if-then-else branching, password security, file compression and remote restart. Trik #05736

#05900 NetDistributor Unlimited User\$914

- Quickly switch between any 3 serial devices with the click of a button
- Works with any Mac-compatible serial device
- Self powered
- Microprocessor controlled
- Plug & play
- Easy to use CDEV
- Select ports on the fly in any application
- Compatible with any Mac



\$128

AXiON Electronic Switch Box

Finally, 3 serial ports for the Apple Macintosh! The AXiON Switch Box is an elegant, yet inexpensive serial port solution. It allows you to maintain 3 additional devices per serial port. You can choose between any port at any time simply by clicking on the appropriate triangle on your desktop. The AXiON Switch automatically remembers the device that you used last. Port 1 is always the default setting whenever the system is reset or turned on, as denoted by the small dot. AXiON #05628

Communicate with Ease!



PSI Comstations

PSI's family of Comstation fax/data modems combine high-speed data transmission with powerful fax capabilities. The five different Comstation models offer a variety of fax/modem solutions to suit the needs of nearly every type of Macintosh user, from the low-cost fax/data Comstation One, to the networkable Comstation Four, to the ultra high-speed V.32bis, fax/data Comstation Five and data-only Comstation Three. Highly intuitive software makes faxing as easy as printing. All PSI Comstations are Hayes and Group III compatible and include cables and fax/data software. PSI Integration

#05696 Comstn 1: 9600/4800bps s/r fax, 2400bps data	\$164
#05697 Comstn 2: 9600 s/r fax, 2400bps data w/V.42, V.42bis, MNP 2-5 ..	\$274
#05698 Comstn 3: 14,400bps data, w/V.42, V.42bis, MNP 2-5	\$408
#05699 Comstn 4: (Network version of Comstation One)	\$344
#05700 Comstn 5: 14,400 fax/data with V.42, V.42bis, MNP 2-5	\$548



\$238

MicroPhone II Go!

The MicroPhone II Go! package consists of: MicroPhone II communications software, After Dark 2.0, TelePort Fax 24/96, CompuServe & America Online Starter Kits, Spectre action game, MicroPhone II t-shirt and a stylish carrying bag. Software Ventures #05486

PowerPort Internal Fax/Modem

Turn your PowerBook into a mobile office with a PowerPort Fax/Modem. PowerPort is completely portable; no separate battery or power source is required. There are three models available: Gold—14,400bps data, 9600bps fax send, 9600bps fax receive; Silver—9600bps data access, 9600 fax send/receive; Bronze—2400bps data, 9600 fax send, 4800 fax receive. Global Village

#05684 PowerPort/Gold	\$628
#05685 PowerPort/Silver	\$448
#05686 PowerPort/Bronze	\$218



Optima 96 V.32 \$398

This high-speed modem provides 9600bps information transfer, and it can communicate with other modems of almost any speed. Its Automatic Feature Negotiation offers efficient combination of speed, error-control and data compression with every use. Connect with information services, bulletin boards and corporate host computers with confidence. Hayes #05307

Optima 24: Special Mac Edition

\$154

Optima 24 delivers high performance at a terrific price. You get 2400, 1200 and 300bps communications, plus V.42/V.42bis, MNP-5 error control, data compression and throughput to 9600bps. Mac-to-modem cable and Smartcom for the Mac (\$49 value) are included. FREE. Hayes #05231



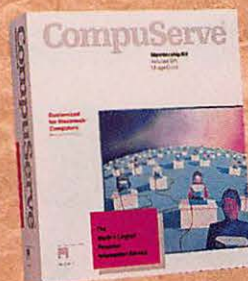
\$88 HayesConnect 3.0

HayesConnect is the software that enables users to share and allocate resources such as modems, plotters and printers. New version 3.0 includes enhanced server features such as device pooling, security, activity logging and Toolbox support. Hayes #05028

CompuServe Macintosh Membership Kit \$24

Begin exploring the world of CompuServe, the largest on-line interactive database service available. You'll get instant access to more than 400 information and communications databases and much, much more. CompuServe #00213 ✓

#00564 CompuServe Navigator 3.1 ✓ ... \$48



FaxPro II \$694

With FaxPro II, sending a fax from any workstation is as easy as printing to a Laser Printer! The FaxPro II system combines a specially designed send/receive 9600-baud group III networkable faxmodem with fax software. Cypress Research Corporation #05530

#05683 Cypress Research Phone Pro \$748



INTERNATIONAL ORDERS CALL 1-206-883-3088

Prometheus Home Office

Turn your Mac into a complete communications system! Home Office adds voice capability to a combination data/fax modem to turn your computer into a fully featured answering machine. Plus, with its ability to detect whether incoming calls are fax, voice or data, it also functions as a line switching device. It's like having 4 separate communication products all sharing one phone line! Offered as a complete package with all the necessary software and cables, Home Office is a low-cost solution for all your communication needs. ☎ ✓



Major Features:

- 2,400bps or 14,400bps data modem versions
- V.42bis/MNP-5 data compression/error correction
- 9600bps send/receive Group III fax
- Voice messaging system

Ultima Home Office with Voice \$488

14,400bps (V.32bis) data modem with V.42bis/MNP-5, 9600bps s/r Group III fax, voice and more. Prometheus #00877 ☎ ✓

Home Office 24/96 with Voice \$258

2,400bps data modem with V.42bis/MNP-5, 9600 s/r Group III fax, voice and more. Prometheus #00907



ProModem Ultima

14,400bps Modem and 9600bps Send/Receive Fax

The ProModem Ultima is the exciting new modem from Prometheus that provides a low-cost solution for high-speed data transfers and networking applications. The Ultima provides you with the ultimate in 14.4K/9600/4800/1200bps, error correction, data compression and precision fax. With it you'll send/receive Group III faxes ultra fast at 9600bps and you'll transfer data even faster (14.4K). It comes complete with Maxfax, Prometheus' own fax software, a powerful program with many features you won't find in any other fax software.

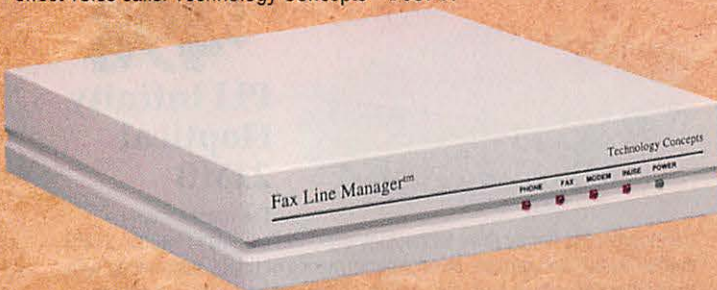
And because the ProModem Ultima follows most communications standards (including CCITT), you can connect to slower modems at 9600, 2400 or even 1200bps. With V.42bis error correction and up to 4:1 data compression, the Ultima can maximize your your throughputs. It also uses MNP-5 for error correction and data compression for backward compatibility with the large installed base of MNP modems. Prometheus #00062

\$379

**Don't Install Additional Phone Lines—
Fax Line Manager Supports Phone, Fax
& Modem on One Phone Line**

Fax Line Manager 203 \$138

Eliminate the need for multiple phone lines with the Fax Line Manager, a voice/data switch that detects and routes voice calls, facsimile messages and modem connections over a single line. The FLM 203 supports three devices, such as a phone/answering machine, a fax and a modem and lets you choose between two different modes of operation: SmartAnswer mode for home use with phone extensions or AutoAnswer mode for use with a PBX or key system. It includes nine programmable functions and does not effect voice calls. Technology Concepts #05741



#05739 Fax Line Manager Model 201 \$84

#05740 Fax Line Manager Model 202 \$98

STORAGE DRIVES

NEW LOW PRICE

\$1574



PLI Infinity 3.5" E Optical Drive

The next phase of optical technology has arrived! The PLI Infinity Optical read/write drives redefine high-capacity data storage. You can store up to 128MB of data on a single cartridge that is almost indestructible, and weighs less than five diskettes. Backed by the manufacturer's 1-year warranty with support provided toll-FREE. PLI #05785

BUILT IN COMPRESSION TO 8GB

\$1778

The PLI 3.5" DAT 4GB

The DAT 4GB pinches pennies and provides peak performance by providing the lowest cost per megabyte available—less than 1¢. Capable of storing up to 8-gigabytes of data on a convenient 4mm cassette, the PLI DAT 4GB can locate and access files in 20 seconds. PLI #05813

- #04698 PLI Infinity 3.5" Optical Drive \$1628
- #02851 PLI 5.25" SONY-Optical 600MB \$3248
- #05621 PLI 5.25" 1GB Max Optical \$3628

\$598

PLI CD-ROM

The PLI CD-ROM is one of the most fully featured CD-ROM drives available. It has a self-cleaning objective lens which eliminates bothersome dust problems. Offers three audio output jacks and supports HyperCard audio XCMD's. PLI #03691



MacUser
★★★★½
November 1991

\$498

PLI Infinity Floptical 21MB

The most exciting development in floppy drive technology ever! PLI's Infinity Floptical 21MB combines the well-proven, reliable performance of floppy technology with the higher capacity of hard disk drives, plus much more. Imagine your standard floppy drive reading and writing 1.44MB floppy disks faster than ever and using 3.5" floppy diskettes with a formatted capacity of 20.8MB. Inexpensive 21MB Floptical diskettes provide unlimited low-cost-per-megabyte storage. Includes turbo cache and turbo optimizer. PLI #04817



\$598

Infinity Turbo 40/88 MB

When you need reliable, flexible storage, you need the Infinity Turbo 40 and/or 88 from PLI. The Infinity is a true work horse, tough enough to take the punishment of constant use. The electrical engineering is top-notch, as are the internal components. Each PLI drive is rigorously tested to meet standards which far exceed industry requirements. The mechanism carries an incredible 60,000-hour MTBF rating. It's virtually impossible to damage the unit by inserting the cartridge incorrectly. Best of all, the Infinity 40/88 Turbo removable hard drive gives you infinite storage potential. Relatively inexpensive 40/88MB removable cartridges are easy to switch and store. Includes Turbo Optimizer, Turbo Cache and disk accelerator software. PLI #02181

- #00182 Infinity 88MB Turbo \$728

NEW PRODUCT

For The PowerBook

PLI 80MB 2.5" Toteable Drive **\$648**

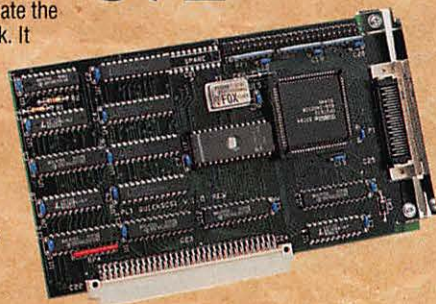
Built for people on the move, PLI Toteable drives offer 80 or 120MB of lightweight storage for the Macintosh PowerBook. Powered by AC outlet or an optional rechargeable battery pack, these rugged 2.5" drives support the PowerBook's power saving features. Toteables are available in PowerBook gray and deliver whisper-quiet operation. PLI #05789

- #05790 2.5" 120MB Toteable Drive \$798



QuickSCSI Card **\$372**

QuickSCSI Card offers a simple, yet powerful way to eliminate the Macintosh SCSI bottleneck. It lets your hard drive work at its maximum possible performance level by supporting high-speed data transfer rates. The disk mirroring option lets you copy the exact contents of an entire drive to another. Run up to 14 SCSI devices simultaneously. PLI #00811



ORDER THROUGH COMPUERVE:SIMPLY TYPE"GO MZ"

\$679

HitchHiker 80MB

HitchHiker offers all the capabilities of a standard external hard drive, yet fits in the palm of your hand. Weighing less than 10 ounces, each drive is shock-mounted in a compact, rugged case that measures only 5.4" x 2.9" x 1.1" (13.7 x 7.5 x 2.8 cm). But don't let the small size fool you. Featuring the latest 2.5-inch drive technology, HitchHiker gives you big drive performance and reliability. Just plug it into any Mac. It can be powered through the ADB port. Compact enough to carry in your shirt pocket, or in your briefcase along with your PowerBook. MASS Microsystems #00971

#00899 HitchHiker 40MB \$478

RECEIVE
YOUR SECOND
21MB FLOPTICAL
DISK FREE

(Limited Time Offer)



\$498

FloptiPak™21

The FloptiPak21 lets you store 21 megabytes of data on a single 3.5" floppy-sized cartridge. Ideal for hard disk backup and expanded storage, the drive is compact, lightweight and its technology offers extremely high reliability. FloptiPak21 reads and writes to standard high-density 1.44MB Macintosh diskettes in addition to its own Floptical® diskettes. #05801

\$549

DiamondDrive Portable 120

With the DiamondDrive Portable 120 it's easy for you to have 120 megabytes of data storage with you at all times. It offers all the capabilities of standard external hard drives in a compact, portable design. Weighing in at under 3 pounds (1.4Kg), the DiamondDrive Portable 120 fits easily into a briefcase. The mechanism is shock-mounted in a rugged, scratch-resistant case. And a DiamondDrive portable is so quiet, you'll hardly know it's there. Mass Microsystems #00336

#00337 DiamondDrive 210 Portable 2" Drive \$949

#00338 DiamondDrive 320 Portable 2" Drive \$1499

#00339 DiamondDrive 510 Portable 2" Drive \$1949

DataPak MO/128 Rewritable Optical Drive

\$1629

Because optical discs use a laser beam to read and write data, they do not wear out, and are not vulnerable to head crashes. This makes them much safer than magnetic hard disks, so they're great for archiving valuable data.

And the cartridges are interchangeable, so you can add extra capacity and transport large files. Mass Microsystems #00332



\$179

Fax Modem 24/96

The MASS Microsystems Fax Modem provides 9600bps fax and 2400bps data transmission. It's fully supported by the universally recognized AT standard command protocol and the Group 3 standard, the latest fax standard that supports 9600bps transmission rates. Comes with feature-packed communications software. MASS Microsystems #00701



DiamondDrive Hard Drives

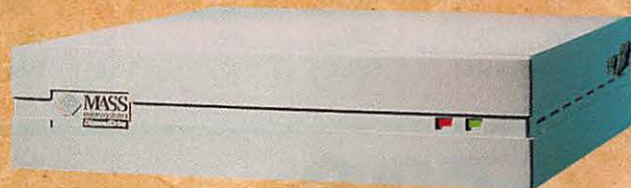
High capacity, high quality and high performance distinguish this family of hard drives. Unsurpassed DiamondDrive features—high data transfer rates of 5 to 6MB/sec. to buffer and 1.5 to 2MB/sec. to disk, fast average access times as fast as 12ms, data buffers of up to 128k, 1:1 interleave and a top rating of 150,000 hours MTBF—make these drives some of the best Mac hard drive values available. Mass Microsystems

#04612 DiamondDrive 120 \$599

#04613 DiamondDrive 210 \$998

#04614 DiamondDrive 320 \$1629

#04615 DiamondDrive 510 \$2148



STORAGE DRIVES

DPI Drives: Don't Settle For Less! Top-Quality At Amazing Prices



**60 Day
Money-Back
Guarantee**

\$358

52MB Quantum External

Our 52MB Quantum is not only fast and reliable, but attractive and ergonomically pleasing as well. Some of its features include: 3.5" LPS drive type, an average access time of less than 17 milliseconds and a throughput speed of 2 to 4MB per second. DPI #04880

The Best For Less!

- Compact, space-saving chassis: Connor, Fujitsu & Quantum externals
- 2-Year limited warranty: Quantum & SyQuest
- Top-quality components manufactured by PLI, the leading manufacturer of after-market hard drives
- Driven by award-winning software
- All DPI drives are covered with a complete 60-day money back guarantee. If, for any reason, you are not completely satisfied with your drive, call us for an RMA number and return it to us for a full refund.

Part#	Formatted MB	Drive Type	Drive Mechanism	Access Time	Throughput Mb/Sec	ZONE PRICE	Cost/Mb
04880	52	3.5" LPS	Quantum	17	2.0-4.0	\$358	\$6
04881	105	3.5" LPS	Quantum	17	2.0-4.0	498	5
04874	240	3.5"	Quantum	16	5.0-10.0	968	4
05786	85	3.5"	Conner	17	4.0-5.0	428	5
05787	120	3.5"	Conner	19	4.0-5.0	554	5
05788	212	3.5"	Conner	12	4.0-5.0	788	4
04451	44	5.25"	SyQuest	19	1.2	528	12
04886	88	5.25"	SyQuest	19	1.2	658	7
05817	425	3.5"	Fujitsu	12	4.0-5.0	1358	3
05366	520	3.5"	Fujitsu	12	4.0-5.0	1584	3

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represent one of the best hard drive values available. Our DPI removable was given top honors by BMUG (Berkeley Macintosh User's Group). All DPI drives are built using only the finest components and drive mechanisms. Each drive is carefully tested for over 24 hours to assure your complete satisfaction. You will not find a better drive for the money.

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#04886 DPI 88MB Removable SyQuest Drive \$658



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Generation Systems 415 Laser Printer

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Tabloid-size printing power in a small, flexible package—that's what you get when you purchase Generation Systems' 415 Laser Printer. It's the smallest tabloid laser printer available. But don't let its small size fool you. The 415 Laser is a serious PostScript 2 business workhorse which has been carefully configured to meet demanding graphics and general office needs. Two paper trays come standard: tabloid (11" x 17"), and letter size (8.5" x 11"). Generation System's sophisticated tray selector software lets you choose which paper you want to print on—eliminating those tedious trips to the printer to change paper trays. The 415 handles even the toughest jobs with ease. The true 400dpi resolution and rugged 15-page-per-minute print engine means your work looks great and prints super-fast! Generation Systems #05582

NEC

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Available**



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Silentwriter Model 95F

If you demand state-of-the-art technology and rely on getting professional-looking documents out of your printer, you need the NEC Silentwriter Model 95. It incorporates the latest in intelligent printer technology—Adobe PostScript II—with the latest in compatibility and performance. The Silentwriter 95 automatically reconfigures for PCs and Macs, simultaneously handles paper and envelopes and automatically detects the source file type and sets the printer accordingly. The Silentwriter prints 6ppm, comes with 2MB of memory and ships with 35 scalable Adobe fonts, 14 bitmat and 8 scalable HP LaserJet fonts. NEC #01032

MICROTEK

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TrueLaser Printer



If you're in search of a laser printer that's fast (6ppm), flexible and simple to use, you've just found it. For speed and versatility, nothing compares to Microtek's TrueLaser printer. This 300dpi laser printer comes with 35 built-in TrueType fonts and is fully PostScript and HP PCL4 compatible. The TrueLaser can also automatically switch between its AppleTalk, Centronics and RS-232C interfaces. Microtek #04047

Fax Card for Silentwriter

\$526

Now you can send and receive original-quality PostScript faxes or conventional faxes from your Silentwriter Model 95 printer! You get the convenience of personal fax capability and the power of PostScript printing in a single desktop product. Fax an original-quality proposal to a sales rep for prompt delivery to a customer. Fax a high-quality proof to your client. The possibilities are endless. NEC #05798

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microLaser PS35 Turbo



The microLaser PS35 Turbo gives you 9 pages per minute and 35 scalable fonts, the latest Adobe Level 2 PostScript. It comes standard with 2.5MB of memory and parallel, serial and AppleTalk interfaces. Its super-small footprint (just 13.4"x14.2") makes it the perfect printer where space is a concern. Texas Instruments #00409

\$1298

PS17 microLaser Plus Printer



The PS17 prints at a speedy 9ppm, so you'll spend less time waiting, more time working. The PS17 comes with 17 Adobe PostScript fonts, a 250-sheet paper drawer and a super small footprint (just 13.4" x 14.2"). Comes standard with serial, parallel and AppleTalk interfaces. Texas Instruments #04096

\$1548

PS35 microLaser Plus Printer



The PS35 microLaser Printer handles even the most complex layouts with ease. MicroLaser PS35 comes with 35 Adobe PostScript fonts and prints from any Mac via the standard Apple, serial or parallel interface. Super-small footprint (just 13.4" x 14.2"). Texas Instruments #04313

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- Stereo Headphones • 4 Size C Batteries •

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From art and music to math, science, foreign languages, computer programming, reading, writing and spelling, the Macademic Software Library is the world's largest collection of educational software. The ideal software for teachers and students of all ages. Quantum Leap #00151

Giga-ROM 2.0 \$98

Quantum Leap has re-released Giga-ROM! This 1,700MB collection of archived shareware and public domain programs for the Mac is designed to provide an entire software library in pre-compressed Compact Pro format for BBS and other uses. The Giga-ROM disc is the world's largest collection of CD software and includes the latest versions of System 7 for all Macintosh computers and thousands of compatible new programs. On Location index included. Quantum Leap #00666



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The GEM Mac 2.0 CD-ROM contains over 620MB of the newest public domain software, including graphics, utilities, sound, INITs and CDEVs and more. Wayzata #05354 ✓

Sound Library 2000 \$84

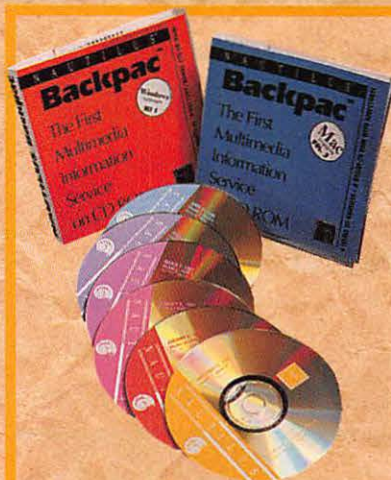
Sound Library 2000 contains over 2000 digitally-recorded sounds for the Mac. Contains 140+MB of auditory files. Wayzata #01019 ✓

Font Fun House \$34

Font Fun House is a fully usable CD-ROM with hundreds of fonts for your Macintosh and IBM-compatible computer. Contains shareware fonts in TrueType and Type 1 PostScript (ATM) formats. Wayzata #05845

Quick Art Deluxe \$171

This voluminous CD-ROM art library contains 3000 professionally hand-drawn images: birds, buildings, celebrations, drinks, education and lots more. Wayzata #00853 ✓✓



Nautilus BackPac: Vol.1 \$44

Nautilus BackPac is a great way to sample the excitement of a CD-ROM monthly subscription service and to discover the most popular multimedia information service available today! You'll enjoy exploring Nautilus BackPac with its over 2 gigabytes of software and information, including games and demos for people of all ages. Whether you love music or photography, education or news, technology or shopping, there's plenty of

BackPac to explore. BackPac: Volume 1 covers Nautilus issues 2/1 through 2/6 (1/91 - 6/91), plus you get a coupon for a seventh CD-ROM, FREE.

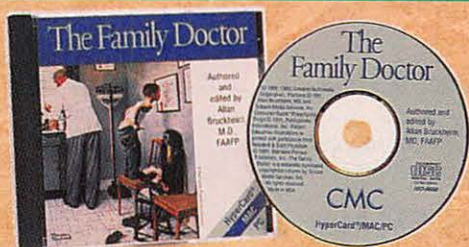
Metatec Corporation #05428

#05429 Nautilus BackPac Vol.2\$44

#05829 Nautilus BackPac Vol.3\$44

Sherlock Holmes, Consulting Detective \$38

ICOM's Sherlock Holmes, Consulting Detective CD-ROM game features over 90 minutes of full-motion color video. ICOM Simulations #05529



The Family Doctor \$44

Owning the Family Doctor CD-ROM is almost like having your own personal physician at your disposal 24-hours a day. While it's not intended to replace your health care professional, it puts a wealth of useful health information right at your fingertips. The Family Doctor comes with:

- Dr. Bruckheim's easy-to-understand advice to over 1,500 of the most commonly asked medical questions
- Approximately 300 full-color medical illustrations
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Creative Multimedia Corporation #05662

#05663 Shakespeare\$18

#05664 Sherlock Holmes on Disc!\$18

#05665 Multimedia Birds of America\$28

#05666 Multimedia Audobon's Mammals\$28

#05667 Taran Trilogy: Quest, Beyond the Wall of Stars\$38



\$61 AudioShop 1.0

Record and edit Macintosh audio and control your CD-ROMs with AudioShop. It features an easy-to-use interface which resembles a home CD player, but with many additional editing features and special effects like echo. AudioShop supports all popular Macintosh sound formats for easy integration with other programs. Runs on Mac Plus and up machines with a minimum of 2MB of memory. Requires System 6.07 or higher. Opcode Systems, Inc. #05580

#05591 EZ Music Starter Kit\$188

\$448 Mosaic 1.0

Mosaic makes music publishing easy. It's attractive, graphic style and careful adherence to Macintosh operating conventions make it a pleasure to use. You get advanced placement and layout algorithms and complete freedom to manually reposition or place any symbols. Mosaic uses a straightforward "click and drag" approach to move notes, dynamics and symbols or to re-shape groupings such as ties and slurs. Mark of the Unicorn #05579

#05578 Digital Performer\$698



Vision 1.3 \$357

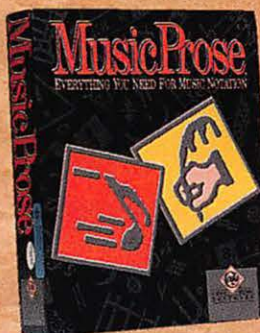
Vision is the professionals' choice for sequencing. Herbie Hancock, Jan Hammer and Thomas Dolby are but a few of the noted musicians who use Vision for their sequencing. Vision uses both graphic editing and list editing, simultaneously! Any data changed in one window is changed in the other, automatically. You can even use both windows on screen at the same time for the same track, each for its most useful features. Vision's graphic editing feature is one of the best ever developed. Click-and-drag notes to new attacks, pitches and durations. Handles 26 sequences per file with 99 tracks each. Opcode Systems, Inc. #04800



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MusicProse 2.1 \$188

Noting your music shouldn't be hard work. And it isn't when you have MusicProse working for you. It provides an elegant balance of form and function—perfect for anyone new to computer notation. Compose, transcribe, orchestrate, playback and publish music, simply and easily, in real time or step time. Change bar lines, clefs and keys. Add rehearsal marks, lyrics and much more. It's everything you need for music notation! Coda Music #03128



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Band-In-A-Box \$57

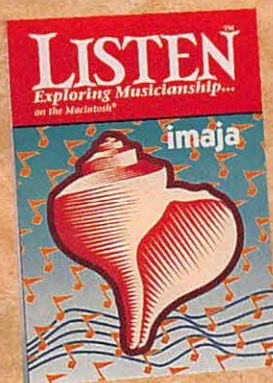
Band-In-A-Box automatically generates a complete professional-quality arrangement of piano, bass, drums, guitar and strings in a wide variety of popular styles. You'll find yourself transposing songs instantly and using chord inversions in any variety of tempos and styles. PC Magazine says, "This amazing little program creates 'music-minus-one' accompaniments for virtually any song, any style."

Band-In-A-Box understands repeats, choruses and verses and even varies the accompaniment, just as human musicians would. Band-In-A-Box is software that repeatedly surprises and delights you." PG Music #03453



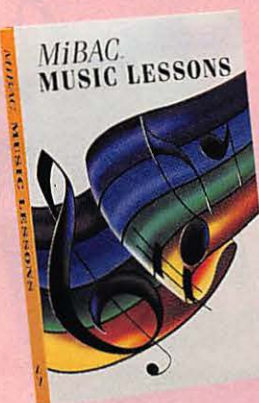
Listen \$64

Listen brings you interactive ear training, the most effective way to teach yourself how to hear and understand melodies, intervals, chord qualities, inversions and tuning. Learn at your own pace. Choose keys, scales, modes and ranges for melodic and interval exercises. Imaga #04281



MiBAC Music Lessons \$74

Learn to read Music, in the comfort of your own home or office, at your own pace. "MiBAC's Music Lessons gets an A-plus," says MacWorld magazine. No previous musical experience is necessary. Music Lessons goes further than simple-ear-training programs. It gives you the basic theory necessary to really understand music. And it's easy and fun to use. Music Lessons is great for kids and adults at all musical skill levels. MIDI optional. MiBAC #04283



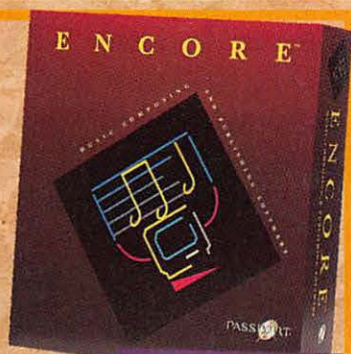
Jazz Improvisation \$79

Jam with a jazz trio anytime you want with MiBAC Jazz Improvisation. It produces professional-quality jazz in a multitude of styles. MiBAC #04284



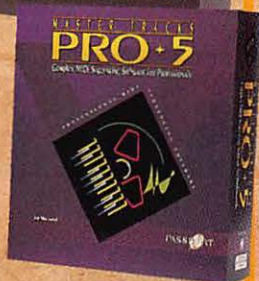
Encore 2.5 \$386

Whether you're transcribing a MIDI sequence, scoring your first musical or transposing individual parts for your band, Encore can easily and efficiently handle the task. Encore 2.5 will notate and print your music, as a complete score or extract one or more staves as individual parts, transposed for different instruments. Passport Designs #00313



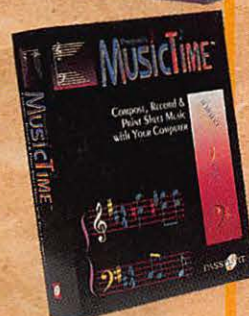
Master Tracks Pro + 5 \$328

Master Tracks Pro 5 combines professional tools for recording, editing and playing back music with the most accessible user interface in the industry. Works with MIDI instruments and the Miracle Piano™. Passport Designs #05264



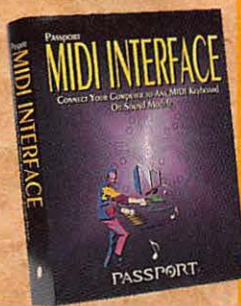
Passport's MusicTime \$158

Passport's MusicTime is a desktop music composing and notation program for use with MIDI instruments and sound cards. Record your own performances. The flexible, easy-to-use interface allows you to enter music with your mouse, play one note at a time from your MIDI keyboard or automatically create a score from any Master Tracks Pro, Trax or standard MIDI file. Passport Designs #05518



MIDI Interface \$59

One of the best MIDI Interface modules available for the Mac, the Passport MIDI Interface for the Macintosh features one MIDI-in and three MIDI-outs. Flashing LEDs indicate MIDI activity. The package also includes A MIDI Overview and Technical Primer written by electronic music wiz Craig Anderton—author, composer, recording engineer and founder of Electronic Musician Magazine. Passport Designs #01355



\$348 ACS-300 Speaker System

The ACS-300 Computer Speaker System is ideal for multimedia computers, CD players and interactive video games. These compact, high-fidelity speakers use patented technology, featuring a long-throw subwoofer that sits under your desk and 2 self-powered satellite shells, each with a 4" woofer and a 1/2" tweeter. Unique geometry offers multiple mounting options. Controls include bass, treble, balance, volume, DSP and A/B mixing. Altec Lansing #05689

POWERBOOK ACCESSORIES

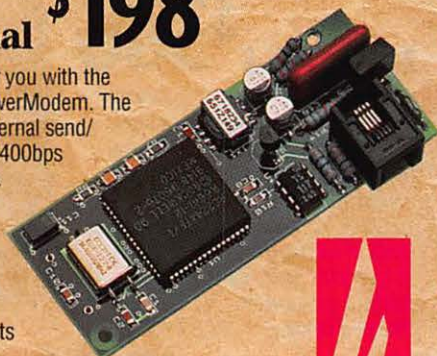
PowerModem \$198 24/96 SR Internal

Make your Mac work harder for you with the unbelievably affordable PSI PowerModem. The PowerModem is not only an internal send/receive fax modem, it's also a 2400bps Hayes-compatible data modem.

The fax is Group III compatible, sends at a full 9600bps and receives transmissions at 4800bps. PowerModem will dramatically improve your PowerBook's performance. It lets you continue to work in any application while its intuitive software performs in the background. PSI #04948

#05694 PSI PowerModem II V.32bis\$548

#05695 PSI PowerModem III 10/42\$274



\$158 External Full-Cycle Battery Charger for PowerBooks 140/170

"Memory effect" is the loss of battery capacity due to using a battery over only a portion of its storage range. Since the PowerBook automatically shuts down on low battery, the battery is never used over its whole range, so it won't develop a memory effect. The Lind External Full-Cycle Charger not only charges the PowerBook 140/170 ni-cad battery but

optimizes full performance and long life by giving you the option to discharge the battery completely before the charging cycle begins.

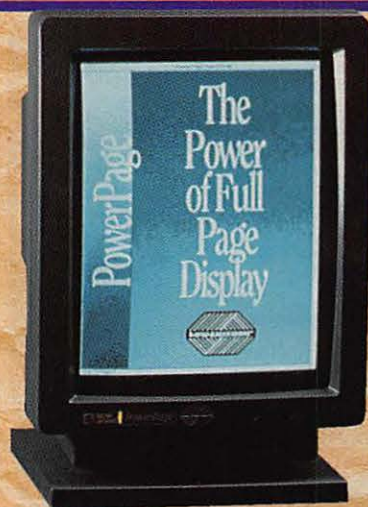
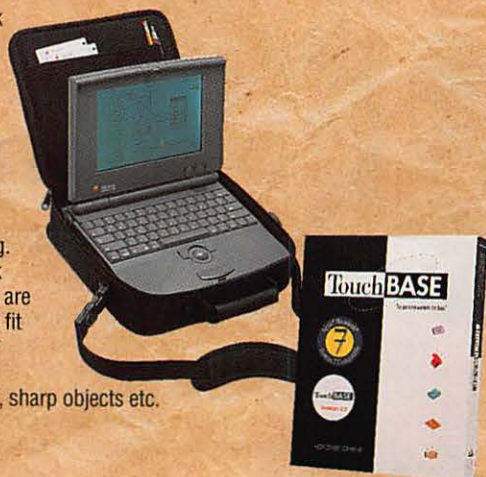
Lind Electronic Design #05354

#05352 Auto Power Adapter\$74

#05355 Auxillary Power Pak\$158

TouchBASE 2.0/NoteBook Traveler Deluxe Bundle \$98

Two terrific PowerBook products bundled into one great value pack! TouchBASE is a database which keeps track of personal and business contacts. It remains handy all the time—no matter what application you're using. Kensington's NoteBook Traveler carrying cases are specifically designed to fit your PowerBook. They protect your system against scratches, dust, sharp objects etc. Kensington #05821



\$784 Power Portrait

This affordable, easy-to-install full-page display plugs directly into the SCSI port of your PowerBook, Classic, ClassicII SE or SE/30 computers. Its 15" full-page display features built in acceleration that lets you race through graphic displays. Choose between 72, 80 and 88dpi. Create a virtual two-page desktop to power through multi-page tasks. Sigma Designs #00571

#00399 Sigma Power Portrait-Platinum\$784



\$86

PowerMerge

PowerMerge solves the problem of keeping track of changes made to your files while working on your PowerBook. It simply and automatically synchronizes files between your PowerBook and your desktop Mac. It also features: notification if files have been changed on both

computers since the last update, history log of updates, include/exclude by file. Leader Technologies #05690

Kensington NoteBook KeyPad \$104

The Kensington NoteBook KeyPad gives you the flexibility and features of a full keyboard when you use your Macintosh PowerBook. Its compact, sleek design is perfect for travel with your PowerBook or any other ADB device. This module can give you function and arrow key control, as well as the standard mathematical and number keys found on an extended keyboard. The keys are arranged in a traditional calculator-style layout, offering quick and easy number entry. The KeyPad is especially useful for entering figures in a spreadsheet and moving from cell to cell. And the function keys make applications like E-mail or network access even easier. The NoteBook KeyPad fits neatly into the Kensington NoteBook Traveler Carrying Case (sold separately). Kensington#05177



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Get the power of CPU and put more power into your PowerBook today!

Connectix PowerBook Utilities

\$48

This "aggressively priced package" (MacWEEK 6/92) is "the first utility program to help conserve power and manage security on PowerBooks" (InfoWorld 7/92). CPU provides all this and over a dozen other controls, including Instant-Wake, Cursor Finder, Battery Manager, and the unique LCD Screen Saver. Connectix #05646 

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UTILITIES

HANDOFF II

Hand-Off II

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Manage and access your files faster and easier with Hand-Off II. This indispensable utility turns the System 7 Apple menu into a multi-level hierarchy for launching, opening and browsing folders and files. You get pop-up menus, automatic compatible application substitution, document briefcases and more. Connectix #04889



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Intermission

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With Intermission you've get more than just a screen saver. You get a true dazzle-my-pupils-help-me-through-the-day scream saver! It comes with over 55 animated modules, full password protection, network support, system CPU monitoring and more. Icom Simulations #05602 ✓

#04542 On Cue II\$54

OffLine 3.0

\$59

The complete disk management system, rated best by MacUser, keeps getting better! Catalogs all your floppies, hard drives, cartridges, even CD-ROMs. A single catalog can hold millions of files on thousands of disks—without gobs of memory. Quick, flexible search engine finds any file on any disk, even if it's not mounted. OffLine rounds up duplicated files across all your disks, for easy cleanup of obsolete documents. Prints floppy labels, exports data to any other application. System Network Architects #00522

\$94

Now Utilities 4.0



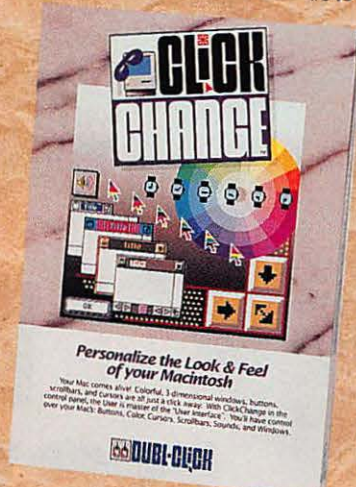
MacUser calls Now Utilities "A must-have for experienced users and novice users alike." The collection includes six modules: Now Menus creates submenus in the Apple menu and can create additional pull-down menus or macros to launch applications or recent files; Super Boomerang finds recent or lost files; StartUp Manager provides complete extension management; WYSIWYG Menus keeps your fonts organized and displays them in their own typeface; Now Save protects work from crashes, and Now ScrapBook (formerly 5-mice rated PictureBook+) allows you to catalog your PICT, EPS, text, TIFF, sound and QuickTime movies. Now Up-to-Date V1.0 keeps your appointments and your associates up-to-date on and off the network. Share calendars, get reminders and print appointment books.

Now Software #04191 ✓

#00580 Now Up To Date\$66

#00572 Now Up To Date 5-User\$258

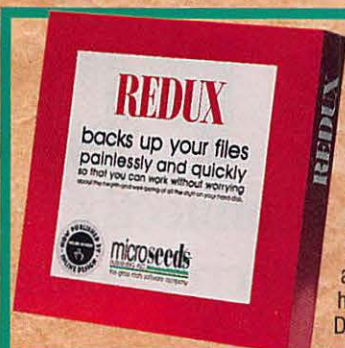
#00569 Now Up To Date 10-User\$394



\$54

ClickChange

Toss ClickChange in the system folder and tailor the appearance of your Mac to suit you. Custom color schemes accompany your choice of button, window and scrollbar styles. Drab old cursors are replaced with exciting, animated, color alternatives. Your Mac responds with exotic sound when and where you choose. Rated 4 1/2 mice by MacUser, and MacWorld says ClickChange "...is a comprehensive collection of fun goodies executed in an extremely professional package." Dubl-Click Software #03616



Redux

\$48

Redux backs up your files painlessly and quickly so that you can work without worrying about the health and well-being of all the stuff on your hard disk. Redux makes backup fast and easy: you can backup your whole hard disk with two mouse clicks. Inline Design #01946

Help!™

\$88

With Help! from Teknosys you can improve the efficiency of your Macintosh and avoid disastrous system crashes. Help! is the only Macintosh utility which uses artificial intelligence to pinpoint system configuration problems and help you solve them. Help! detects conflicts, incompatibilities, improperly installed files, environmental problems, damaged files and more.

Teknosys, Inc. #00867 ✓



HAM

\$48

With HAM you can easily choose which items appear in your Apple menu, and even change the order in which they appear! HAM automatically adds your most recently used files, folders, applications and servers to the Apple menu—so the information you need the most is at your fingertips, without any effort at all! Inline Design #04807

#02191 INIT Picker 2.02\$35

#03327 Rival\$54

#02605 Screen Gems 1.2\$34

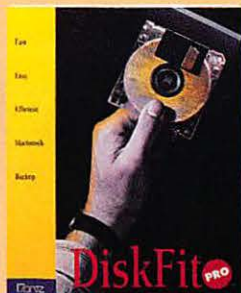


MAJOR CREDIT CARDS ACCEPTED

OVERNIGHT DELIVERY

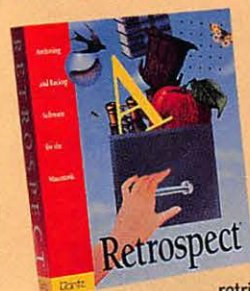
DiskFit Pro \$72

DiskFit saves you time by providing fast, easy, efficient backup to disks, cartridges or optical devices. It copies only new versions of files to the backup, keeping backup sets compact and backups fast. Files are stored in Finder format for easy retrieval. Compatible with both System 6 and 7, DiskFit Pro is the ideal backup solution for any Macintosh. Dantz #04722 ✓✓



Retrospect \$146

Retrospect provides automatic, unattended backup for any Macintosh to tape, cartridge or optical device. Set it up once, and the built-in calendar backs you up again and again. It also saves hard disk space by archiving seldom-used files to the backup media for future retrieval. Retrospect Remote brings the power of Retrospect to an entire AppleTalk network. Dantz #2586



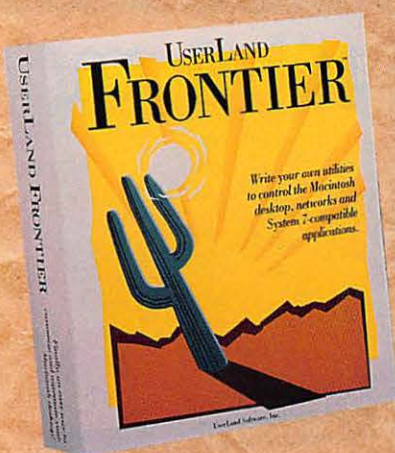
- #03828 Remote 10pk w/o Retrospect \$146
- #04194 Retrospect 1.3 w/Remote 10pk \$263
- #00484 Retrospect 1.3 w/Remote 50pk \$648

UserLand Frontier \$188

UserLand Frontier gives you the power you need to turn tedious, error-prone desktop clicking and dragging tasks into efficient scripts that help you get more work done, more accurately, in less time. If there's a tedious and repetitive job you have to do, write a Frontier script to do it automatically while you're at lunch!

UserLand Frontier is the first scripting software that allows you to write your own desktop utilities to customize, automate and simplify your Mac. With it you can write your own utilities to control your Mac desktop, networks and System 7-compatible applications.

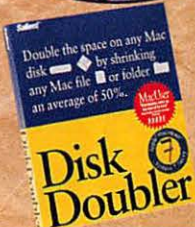
If you can code a macro, you can write a Frontier script that customizes or modifies your desktop to fit your specific needs. Or, if you have experience writing HyperTalk scripts, dBASE applications, MS-DOS batch files or Unix shell scripts, so much the better. The more experience you have programming, the more power you'll get from Frontier. It's a gutsy, powerful programming language that won't limit the creativity of professional C and Pascal developers. UserLand #05323 ✓✓



AutoDoubler

AutoDoubler is one of the easiest ways to increase your hard disk capacity. It automatically keeps your hard disk compressed. It's lightning quick and completely transparent, so it won't interrupt your work.

Salient Software #04955 ✓✓



DiskDoubler 3.7

Make your disk drive more efficient. DiskDoubler effectively doubles or triples your storage capacity. Salient Software #03515 ✓✓

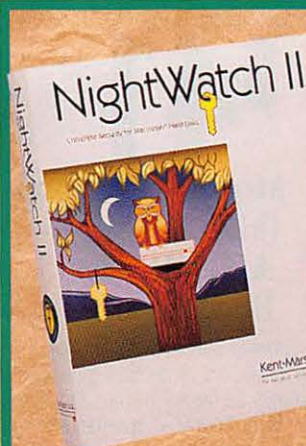
MacLink Plus/PC with Cable \$128

MacLinkPlus/PC contains the same translators and DOS disk mounting capabilities as MacLinkPlus/Translators, plus you get a cable and modem communications software to physically connect a Mac and a PC. DataViz #04916 ✓✓



MacLink Plus/Translator 6.0 \$108

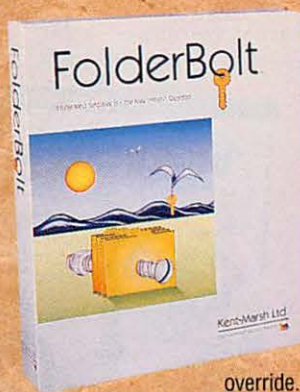
Transfer and translate files between Macs and PCs—with all of your formatting intact! MacLinkPlus/Translators solves all of your Mac/PC incompatibility problems. MacLinkPlus/Translators includes DOS mounting software that allows your Mac Superdrive to read and write DOS disks. MacLinkPlus/Translators also translates the PC files! DataViz #04771



NightWatch II \$88

Protect your hard disk from unauthorized access with NightWatch II. Its instant screen privacy feature thwarts snooping and well-intended rummaging through your desktop. It features a multitude of protection & timed-locking options, animated screen-saving images and entertaining sounds.

Provides rigorous protection at its friendliest. Kent Marsh #04981 ✓✓



FolderBolt \$72

Protect your valuable or confidential information from security breach! With FolderBolt, you can create locked folders, read-only folders or drop folders with a simple shift-click of the close box. They can't be opened, duplicated, deleted or moved without the user-definable password. If you like, you can lock/unlock them all at once. The package comes complete with activity logging and administrator

override. Fully System 7 compatible and Savvy. Kent Marsh #00258 ✓✓

Kaboom!



More than 150 wild and wacky sounds for your Macintosh

Kaboom! \$28

Coughs, crows, crickets and car alarms! Using a Macintosh was never this much fun! With Kaboom! you can add more than 150 wild and wacky sounds to your Macintosh. Each one can be played every time you start up your computer, insert a disk, empty the trash and more. Amaze your friends with the sound of traffic jams, screams and ringing phones—even famous dialogue from "Twilight Zone," "I Love Lucy," Ronald Reagan and

others. With Kaboom! you'll never have to settle for a simple beep again. Nova Development #05268

FREE Mouse Pad!

Buy Kaboom! now and get this colorful Kaboom! mouse pad from the Mac Zone absolutely FREE, while supplies last!



\$41

More After Dark (M.A.D.) & After Dark Bundle

After Dark, the ultimate screen saver collection, comes with over 30 displays including Flying Toasters and Fish! With sound, password protection, logo and message displays. More After Dark comes with over 25 incredible new displays for After Dark. Features contest winners Mowin' Man, Tunnel, GraphStat and beautiful new fish! Includes Virex®-D virus detector, Crazy Kittens and Lunatic Fringe game modules. (Requires After Dark software.) Berkeley Systems #04046

#04053 More After Dark Vol. 1 \$22
#02785 After Dark 2.0 \$28

DupLocator

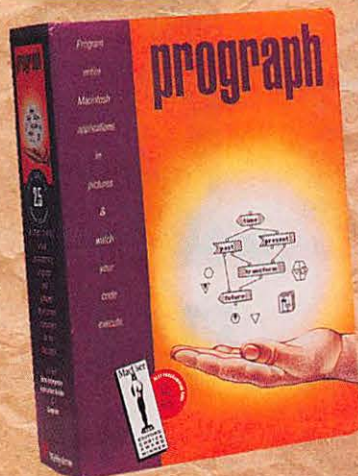
\$58

Find and organize your duplicated files, fast! DupLocator quickly locates and lists duplicated files. It works with floppies, hard disks, removable media, CDs, tape drives, shared volumes and SCSI devices.

Midnight Software #05598



Powerful Programming Tool



\$298

Prograph 2.5

With Prograph 2.5 you can develop complete stand-alone applications without typing long files of C, Pascal or other textual code and you can create user interfaces as fast as you can draw. Prograph helps you develop large or small applications, FAST!

TGS Systems #04253

ShadowWriter \$74

Gizmo Technologies' ShadowWriter transforms your inexpensive solo printer into a shared printer that any Mac on an AppleTalk-compatible network can use! Share your Personal LaserWriter LS, SC, IISC, ImageWriter, DeskWriter, PaintWriter or any other serial printer or plotter. Just one package gives an unlimited number of network users access to your printer.

Gizmo Technologies #04159



Stuffit SpaceSaver \$34

Stuffit SpaceSaver invisibly compresses your files and folders so quickly and quietly you may never notice it's there. At just about the speed of your hard disk, Stuffit SpaceSaver can compress and expand on-demand (as you specify) or automatically (while your Mac is sitting idle). Most importantly, you don't have to change the way you work on

your Mac. Double-click a file in the finder. Open a document from an application. Everything works the way it usually does. But with one difference—your files take up less space! Aladdin Systems #05828

Stuffit Deluxe 3.0 \$72

Stuffit Deluxe is the easy-to-use Macintosh standard for transparent compression, encryption and archiving. Files can be compressed down as far as 98%, with 60% being the average. Stuffit Deluxe comes with a handy Magic Menu Finder Extension utility which makes compression as simple as clicking on any file, folder, or disk icon. Compressed files can be manipulated as needed. Awarded 5 mice by MacUser magazine. Aladdin Systems #05827



CALL FOR
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LOW PRICES

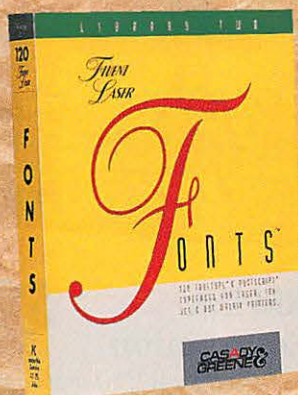
FAX YOUR ORDER ANYTIME: 1-206-881-3421

Four Ways to Help Manage Your Work

Fluent Laser Fonts Library 2 \$98

This collection of high-quality, remarkably priced typefaces offers an expansion of the popular original collection. Library 2 contains 120 different typefaces in both TrueType and PostScript Type 1 versions. The True Type fonts support most printing devices including dot-matrix printers, ink jet printers and laser printers.

Casady & Greene #00315

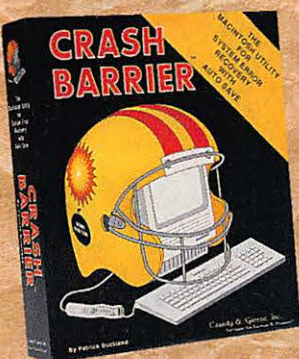
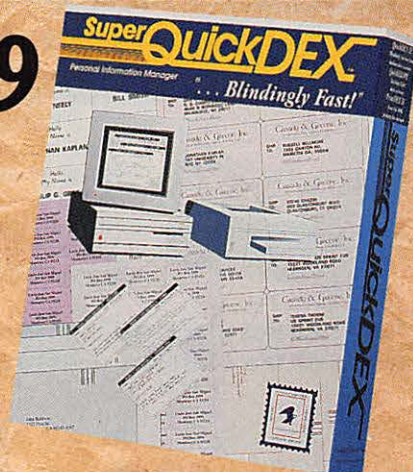


Super QuickDEX \$49

Finally, a database utility which provides complete integration of database envelope formatting and printing! Some of its other features include: list merging, batch envelop printing and more. It even Imports and exports to/from other applications.

Casady & Greene #04810

#4700 QuickDEX II\$22



Crash Barrier \$45

Now novices and power-users alike can beat those system error blues. Crash Barrier increases your productivity by preventing problems before they arise, offering a choice of options when they do, and by minimizing the damage if all else fails. Casady & Greene #4761

NEW PRODUCT

Conflict Catcher and Other Innovative Utilities \$54

New five-utility package containing: Conflict Catcher™, Memory Maxer™, Color Coordinator™, Whiz-Bang Window Accelerator™ and HotDA™.

Casady & Greene #05844

Five Ways to Ignore Your Work!

Glider V.4.0™ \$28

Can you pilot your glider through the rooms of the eerie mansion without crashing? Be forewarned, it's a challenging feat. Numerous and varied obstacles attempt to impede your progress.

\Casady & Greene, Inc. #04580

Mission: Starlight™ \$28

Your starfighter awaits to take you into hyperactive arcade madness! The evil leader of the Aalgezy Empire has enslaved the people of your own Procyon solar system and only you can stop him. You'll be blown away by the realistic flight action of this game.

Casady & Greene #03463

Mission: THUNDERBOLT™ \$28

You must capture an anti-matter bomb from hostile aliens who are trying to annihilate the human race. Venture into the depths of an abandoned underground research complex, battle aliens and wage combat using hi-tech weaponry. Ouch, watch where you point that laser! Casady & Greene #05047

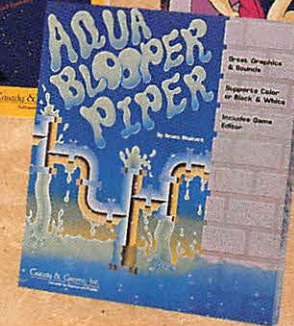
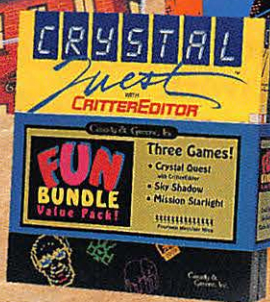
Fun Bundle \$58

Fun Bundle includes three award-winning games for one low price. You get: Crystal Quest With Critter-Editor (5-mice rating, MacUser); Sky Shadow (5-mice rating, MacUser); and the exhilarating Mission: Starlight (4-mice rating, MacUser).

Casady & Greene #04582

Aqua Blooper Piper™ \$28

How fast can you fit together the weirdest pipe fittings you've ever seen and reconnect the basement pipes? One false move will wash you up. Select pipes from the conveyor belt and fit them together without making a blooper! Casady & Greene #04581





Berlitz Think & Talk \$118

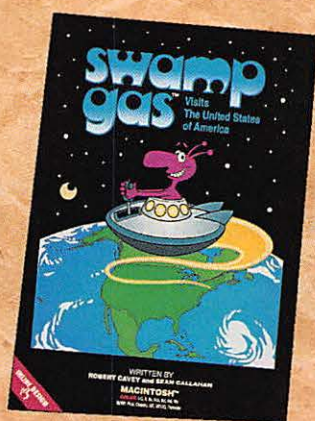
Learn a new language in 30 days or your money back! Think & Talk, the world's most successful language program, is now on CD-ROM. There are no tedious translations and no endless memorization. Fifty lively interactive scenes filled with extensive recorded dialogues, witty graphics, and audio cues help you learn fast. HyperGlott Software

#05437 Berlitz Think & Talk German
#05438 Berlitz Think & Talk French

#05439 Berlitz Think & Talk Spanish
#05440 Berlitz Think & Talk Italian

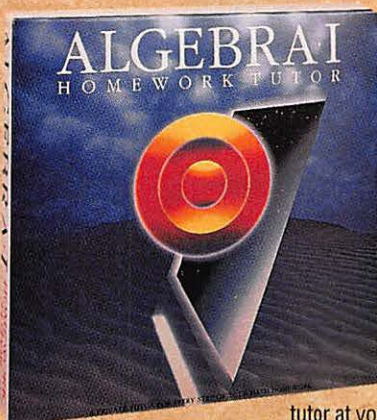
Swamp Gas Visits the U.S. \$31

You're an alien cruising over the United States in a flying saucer. You visit all the states, major cities and landmarks. Awarded Honorable Mention 1991 MacUser Eddy award for "Best Children's Program." Includes three FREE arcade games. INLINE DESIGN #04251



Super Solvers Spellbound! \$34

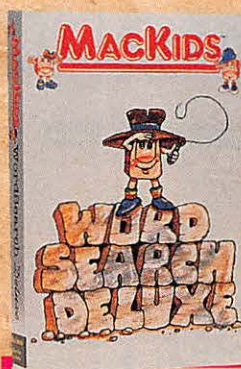
The Master of Mischief has challenged you to the ultimate spelling bee. Out-spell him and his friends and you could reach the White House! Spellbound! offers spelling enrichment, captivating animation and sound effects. The Learning Company #05652
#05126 Super Solvers Midnight Rescue \$34



\$49

Algebra I Homework Tutor

Algebra can be tough! With Algebra I Homework Tutor you have your own private tutor at your side. Enter your own math problems into the "smart" editor and the program walks you through the process. Missing Link Software #05379



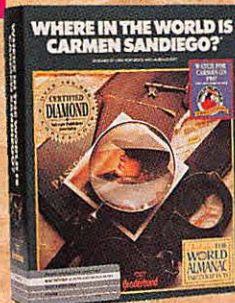
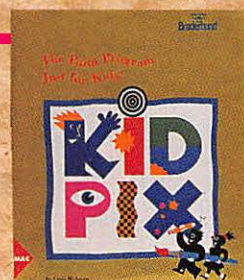
WordSearch Deluxe \$34

Improve your vocabulary in any subject area while you have fun solving word puzzles. Use WordSearch Deluxe by itself to create, solve and print word puzzles, or use it in combination with word processing, color paint and desktop publishing programs for more decorative results. Nordic #06059

#03102 Word Quest \$30

Kid Pix Companion \$24

Kid Pix Companion is the amazing paint program for kids that produces the best-looking art you've ever heard. It combines goofy graphics, silly sounds and magical special effects. Brøderbund #05512



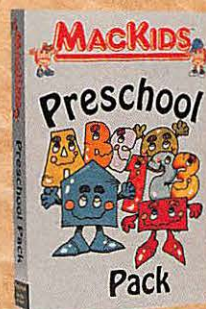
Where in the World is Carmen Sandiego? \$28

This time Carmen could be anywhere, anywhere in the world. By the time you find her you will know a great deal more about world history, geography and culture. Comes with a copy of the World Almanac. Brøderbund #02186

MacKids Preschool Pack \$34

Give your kids a jump-start into the age of computing! MacKids Preschool Pack gets them started in the right direction with six full-color educational programs that hold their interest while teaching the alphabet, counting, concentration and valuable computer skills. Nordic #03101

#01931 Turbo Math Facts \$24



Programming for System 7 \$18

Each title teaches you how to program under the latest Mac technology. Addison-Wesley #01040

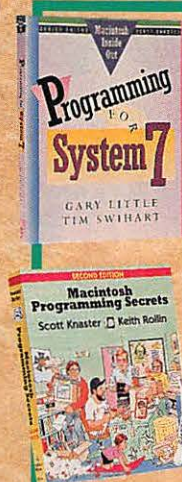
#01041 Programming QuickDraw \$17

#01042 Extending the Mac Toolbox \$17

#01043 Debugging Macintosh SW \$24

Macintosh Programming Secrets: 2nd Edition \$19

Programmers flocked to the first edition of this acclaimed classic. The new version has been thoroughly updated for System 7 and other new Mac technologies. Addison-Wesley #05525



ONE-STOP SOURCE FOR ALL YOUR MAC NEEDS

Minotaur, The Labyrinths of Crete \$44

You and your opponents (up to 8 can play) are thrown into a huge randomly-generated labyrinth where you'll battle to the death. Bungie Software #00639

Hellcats Over the Pacific \$38

Jump into the cockpit of an F6F Hellcat and rule the skies over Pacific islands. Provides fluid graphics, 256 colors and sound. Graphic Simulations #01046

Lexi-Cross \$28

This futuristic, word-puzzle, TV game show parody puts your memory, strategy and puzzle-solving skills to the test with challenging trivia puzzles. With over 600 puzzles to solve, it's always thought-provoking. Interplay Productions #00859

Puzzle Master \$26

Use your Mac to solve crossword puzzles, or create your own puzzles for fun or profit. Puzzle Master includes 250 of the classic *The New York Times* puzzles, 200 Daily puzzles and more. Centron #04554

Crossword Creator \$39

Create crossword puzzles quickly and easily on your computer. Simply type in the words and Crossword Creator will instantly generate the puzzle. Includes Roget's New Thesaurus. Centron #05071

Moriarty's Revenge \$31

The infamous Dr. Moriarty is now leader of a world-wide crime organization. Only you can track him down and bring him to justice. Mysterium Tremendum #03290

Cosmic Osmo & the World Beyond the Mackrel \$28

Strap yourself into an Osmobile and head out for a cosmic trek through a wacky solar system. You'll spend hours exploring the extraordinary worlds of the Osmoian solar system. Cyan #02528

#03493 Cosmic Osmo\$34

The Manhole \$18

Jump into your Macintosh and follow a wacky rabbit into his home in the fire hydrant. You'll enter a whimsical world where every animal talks and every new hallway leads to another wild dream. Cyan #02235

#02541 The Manhole CD-ROM\$22



The Battle of Britain II \$31

Buckle-up, you are about to assume the awesome responsibility of defending England against Germany's legendary Luftwaffe. Recreates the greatest air battle in history. Deadly Games #05041

BOMBER 2.5 \$30

You and your 10-man crew pilot your flying fortress "Naked Lady" on 25 missions over Hitler's Germany. Fully System 7 compatible. Deadly Games #05040

MouseStick Joystick 512 & Plus \$58

When it comes to Mac joy sticks, it's tough to beat Advanced Gravis' high-scoring MouseStick. Advanced Gravis #02740

#02741 MouseStick ADB\$58

Mutant Beach \$34

Overcome amusingly mutated creatures and more to return the stolen nose to his island's idol. "The coolest animated action-adventure/arcade game of the year!" -MacUser Magazine. INLINE DESIGN #04252

3 in Three \$31

The latest game from legendary Mac game author, Cliff Johnson, 3 in Three gives you over 80 animated word and logic puzzles. Elected to Game Hall of Fame and picked as "Best Game of the Year" by Macworld. INLINE DESIGN #03599

Tesseract \$31

Named "Best Brain Game," Macworld Game Hall of Fame, January, 1992, Tesseract is a color puzzle game in which you eliminate tiles from the "board" according to color and texture. There are 9 different boards and 3 levels of difficulty. INLINE DESIGN #03934

Darwin's Dilemma 2.0 \$31

Darwin's Dilemma is an addictive color puzzle game in which you move and merge life-form icons to work your way up the evolution tree. INLINE DESIGN #03494

Tristan: Solid State PINBALL \$39

Tristan is digital pinball you have to see to believe. Fabulous sound, realistic ball action and an excellent array of scoring possibilities make Tristan remarkably real life. Amtex #00600

Take Your Mac Anywhere With I/O Design Cases



Ultimate Carrying Cases

Put your Macintosh into an Ultimate carrying case from I/O Design and you can take it anywhere. These premium-quality cases pamper and protect your Mac with high-density foam padding. The sturdy DuPont Cordura® Plus nylon exterior looks great and minimizes weight. Inside, you'll find a padded compartment for your keyboard (any model), mouse, external hard drive and cables. Two exterior pockets hold everything from manuals and floppy disks to sweaters and umbrellas. Available in Black or Navy. I/O Design ✓

#05546 Ultimate Classic/SE Case	\$68
#05545 Ultimate Classic/SE Extended Case	\$74
#05547 Ultimate LC w/12" RGB Monitor	\$94
#05548 Ultimate StyleWriter	\$62

Mac PowerBook Cases from I/O Design

The Ultimate SL (Right) is a custom case designed to carry any Macintosh PowerBook, floppies, pens, business cards, manual and AC adapter. The Ultimate EX (Left) has the same features as the SL with additional space for a floppy drive, batteries, printer and cables in a lower compartment. Both cases are available in black, navy and teal colors. I/O Design

#05539 Ultimate Notebook SL Cases	\$58
#05538 Ultimate Notebook EX Cases	\$64



Protect Your Computer Investment From Dust and Damage

Nylon Dust Cover Series

Cover your system and protect it from clogging dust and accidents. We have a complete line of Basic Needs Mac Covers. Call our helpful sales advisors for the one that fits your system. Basic Needs



Basic Needs Product List

#00044 Mac Class w/LC kbd	\$16	#00104 Mac LC mon LC kbd	\$17
#00058 Mac Plus w/Plus kbd	\$16	#00106 LaserWriter IISC/NT/NTX	\$17
#00089 Mac IICx/ci w/ext kbd	\$17	#00107 HP Deskjet/DeskWriter	\$11
#00100 Mac II/X/fx mon ext kbd	\$17	#00108 HP Laserprinter II/III	\$15
#00102 Mac IIsi 13" mon ext kbd	\$17	#00130 Mac SE std kbd	\$16
#00103 Apple ImageWriter II	\$11	#00132 Mac SE ext kdb	\$16
		#00931 Mac LC/12 mon/LC kbd	\$17
		#00933 Mac IICx/ci port display ext kbd	\$17
		#00934 Mac IIsi 12" mon ext kbd	\$17
		#00935 Mac IIsi 12" mon std kbd	\$17
		#00936 Mac IIsi 13" mon std kbd	\$17
		#00940 StyleWriter Printer	\$11
		#00942 Personal LaserWriter SC/NT	\$17
		#05451 Mac 13 Monitor	\$11
		#05450 Mac 12 Monitor	\$11
		#05471 Mac Quadra 700 vertical	\$12
		#05472 Mac Quadra 900/950	\$17
		#05473 Portrait Display	\$12



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\$106

Turbo Mouse 4.0

Operate your computer at turbo Speed! Kensington's Turbo Mouse has won more awards for Best Macintosh Input Device than any other. It features significant advancements in trackball technology. Brilliant Cursor™ command technology, for example, lets you automatically jump to user-defined areas on screen with virtually no effort.

The Turbo Mouse 4.0 trackball also features an improved hardware design with a large ball for greater control and comfortably positioned buttons that have a light, easy-to-click feel. Two Apple Desktop Bus (ADB) connectors let you chain other input devices—even use your Turbo Mouse trackball and your standard Apple mouse at the same time!

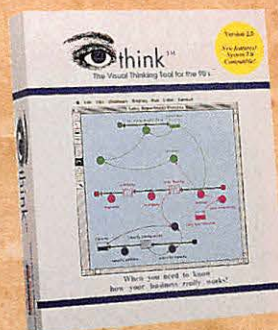
The new Turbo Mouse software combines advanced acceleration, "enhanced mouse button" commands, plus other user-programmable features. It's fully System 7 and A/UX-compatible. Measuring only 4.5"x5.75," Turbo Mouse is constructed of durable ABS plastic and is designed to match Macintosh computers. Comes with the manufacturer's limited lifetime warranty. Kensington #01292



i think 2.2

\$424

Get on top of the learning curve with i think, the amazing software package that accelerates both individual and organizational learning. The user-friendly graphical interface enables you to map, model and simulate business and organizational processes. High Performance Systems, Inc. #03837



Refill Your Printer's Ink Cartridge for Half the Price!

CompuJet Ink Cartridge Refills

CompuJet Ink Cartridge Refills by American Ink Jet are the easy and economical way to keep jet printers printing at their best possible quality.

You will appreciate the bold, extra-vivid colors, the ease of refilling and especially the savings (usually about half the cost).

For the past eight years, American Ink Jet has been the world leader in high technology ink products. This technology has been used to produce ink jet refill systems that meet or exceed the original equipment manufacturer's ink specifications. American Ink Jet



#05067 CompuJet BubbleJet Ink Refill System	\$14
#05069 CompuJet DeskJet Ink Refill System	\$14
#05068 CompuJet StyleWriter Ink Refill System	\$14
#05066 CompuJet PaintJet Ink Refill System	\$18



\$125

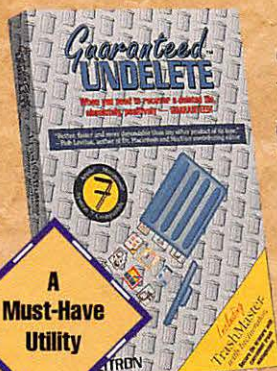
Mac 101E Keyboard

Successor to the best-selling MAC-101 keyboard, the MAC-101E is renowned for tactile-feedback keys that give you the touch and feel you need for faster typing with fewer mistakes. Utilizes the extended 105-key layout with built-in function key template system. Its advanced ergonomic design includes color-delineated keys, caps/periods-lock and interchangeable control caps-lock keys. Compatible with every model of Macintosh. DATADESK #01584

Guaranteed Undelete

\$44

Other utilities insist that you take your chances when you undelete a file. Only Guaranteed Undelete ensures that deleted files are reclaimed in the order they were deleted, GUARANTEED! Simply browse the menu of deleted items and select the file or folder you want to recover. You can even recover files on remote volumes. It's the ideal safety net if you copy files back and forth to your PowerBook! Utilitron, Inc. #05743



FastLabel Labeling Software

Especially designed to simplify label printing!



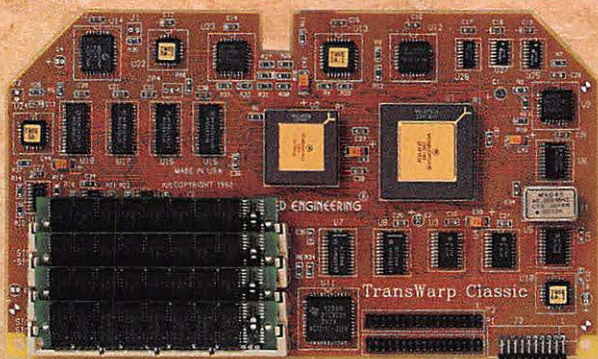
\$42

Saves You Time

FastLabel 3.1

FastLabel 3.1 prints labels in three easy steps: choose a template, enter or import the names and addresses, then print. It prints all popular label sizes (including Avery), and generates postal barcodes. Control font & style and create new templates and layouts. Import PICT or EPS graphics. Supports all Mac-compatible printers. Labels Included. Vertical Solutions # 00576

Boost Your Productivity With Applied Engineering



TransWarp Classic

\$478

Increase the processing speed of your standard Mac Classic by as much as 4 times! This 16MHz 68030 accelerator/memory expansion board for the Macintosh Classic upgrade for the Macintosh Classic will change the way you see your machine. The TransWarp uses a 32K fast static RAM cache together with a 68030 processor to give you processing speed you never dreamed your Classic was capable of. The board comes standard with a 68882 floating point unit (FPU) math chip that greatly enhances the speed of any math functions, so your CAD programs and spreadsheets run like lightning. Plus, you get four on-board SIMMs sockets which allow you to transfer the existing memory in your classic. You can even add more memory! Applied Engineering #05363



AE Plus Drive 1.44/800K FD

\$298

The new 1.44MB floppy Plus Drive is one of the finest drives available for the Mac. Some of its many features include: SuperDrive capability with the Mac Plus, SE and Mac II family; MS-DOS compatibility; two color read/write activity light; auto, touch and paper clip eject; die-cast Apple "platinum" case; and the manufacturer's full 1-year warranty. Applied Engineering #04956 ✓
#05315 Cable for Mac II \$14



Rhino Carrying Bags

#05906

Nothing protects your computer like a quality Rhino carrying case. Rhino's unique, cushioned, thermoplastic barrier with its double wall, honeycomb design, elastically disperses any shock. The unique velcro-edged partition dividers let you adjust the interior partitioning to custom fit your equipment. Expandable models incorporate a patented, zippered compartment that can dramatically increase the case's capacity. Rhino cases are made in the U.S.A from tough, weatherproof, stain and tear resistant CORDURA nylon and the finest workmanship and quality materials available. Covered by the manufacturer's 1-year limited warranty. Color: black. Innovative Manufacturing

- #05906 Universal PowerBook, Expandable: 17"x4"x14" \$78
- #05907 PowerBook/Fax Case: 13.25"x2.5"x13.25" \$44
- #05910 Best PowerBook Case: 15"x2.5"x10.25" \$38
- #05908 PowerBook/Fax Case, Expandable: 13.25"x2.5"x13.25" \$54
- #05909 PowerBook/Fax Case, Leather: 13.75"x2.5"x13.75" \$128
- #05911 Best PowerBook Case, Leather: 15"x2.5"x10.75" \$124

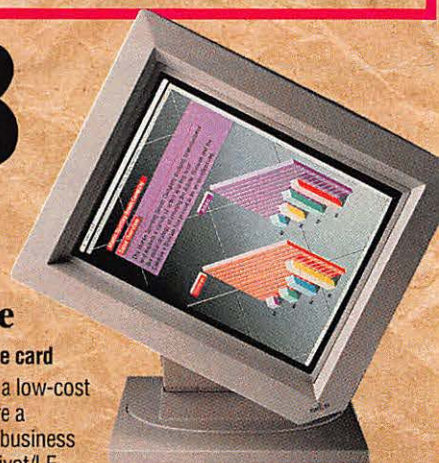
\$898

Radius Color Pivot/LE Display Bundle

Includes Color Pivot interface card

The Radius Color Pivot/LE is a low-cost solution for users who require a productive color desktop for business applications. The 15" Color Pivot/LE offers portrait and landscape operation so you can view your documents in either orientation, whichever is best suited for your purpose. Color Pivot/LE requires a Radius Color Pivot video interface for 256 colors and offers a high resolution of 832x624, 78dpi at 72Hz refresh. Full pivoting, ergonomic design and excellent image focus and clarity are standard features. Priced very attractively, this display is compatible with the Macintosh Quadra, II series, LC and SE/30 computers.

- Portrait and landscape orientations allow you to present your document in the view best suited for your current application.
 - Affordable price provides an excellent alternative to higher-priced, similarly featured 16" displays.
 - 15" color display shows a page of text, numbers or graphics for expanded views of your work.
 - 256 colors creates compelling documents and presentations.
- Radius #05490

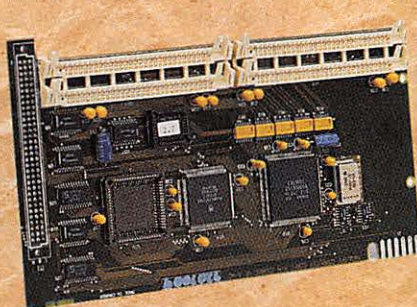
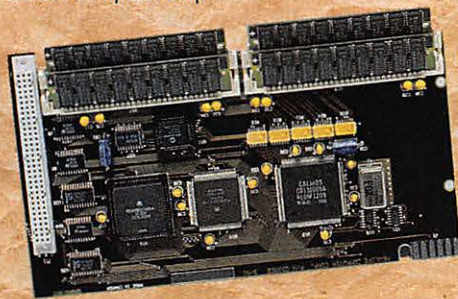


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NewLife 16MHz Accelerator! w/o FPU (Classic/SE)

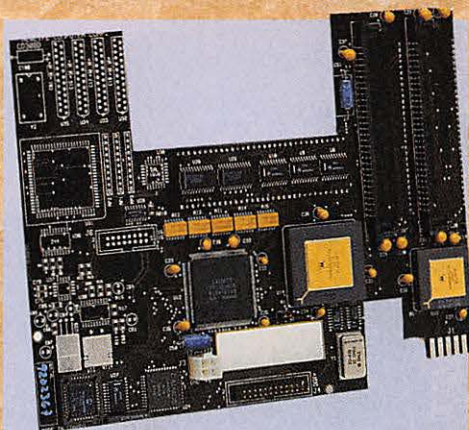
Put high performance acceleration into your Mac, at a price that will surprise you. With the NewLife Accelerator! you can run applications that require more processor speed or memory, and you can use fast SCSI hard disks to quickly access large amounts of data. NewLife Accelerator! really does give your old Mac a new life and allows you to stay productive in today's rapidly changing software environment. NewLife Computer Corp.



- Features a flexible memory expansion structure using SIMM technology. You can use either 1MB or 4MB SIMMs to provide either 4MB or 16MB of system memory.
- Compatible with System 7

- Supports virtual memory through "virtual™" by Connectrix.
- Powered by a 68030 CPU
- Gives you the performance you need to run powerful programs fast!

#04952 NewLife 16MHz Accelerator! w/o FPU (Classic)\$489
 #04919 NewLife 16MHz Accelerator! w/o FPU (SE)\$398



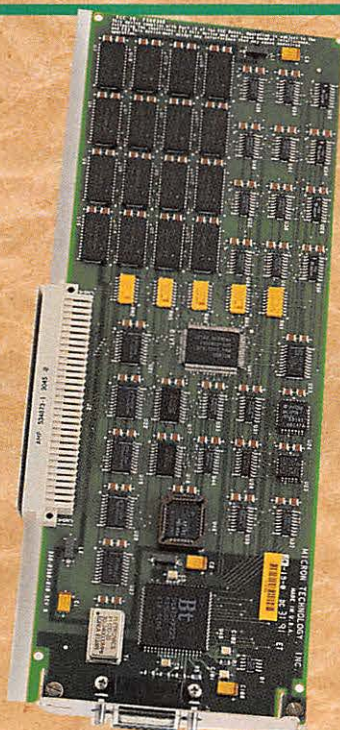
**16MHz w/ FPU \$579
Mac Plus**

Make your Plus a serious business tool with a NewLife 16 Accelerator! Add a high speed SCSI port, 68030 power with FPU to speed you through your work. Run System 7 effortlessly and expand your memory to 16MB (VIRTUAL 3.0 required). NewLife Accelerators deliver the speed you need at a price you can afford. NewLife Computer Corp. #04915

\$468

Xceed MacroColor II 24-bit Board

Based on Xceed's exclusive enhanced NuBus architecture, the MacroColor II achieves nearly twice the performance of the leading 24-bit card without the need for additional (and costly) acceleration. Made for your standard 13" or 14" monitor, the MacroColor II will display 16.7 million colors at 640x480 resolution. Fully compatible with System 6 and System 7, it includes the Virtual Video desktop expansion utility and 8/24-bit MacroPaint software, plus a five-year registered warranty and unlimited, toll-free technical support. Xceed Technology #00608



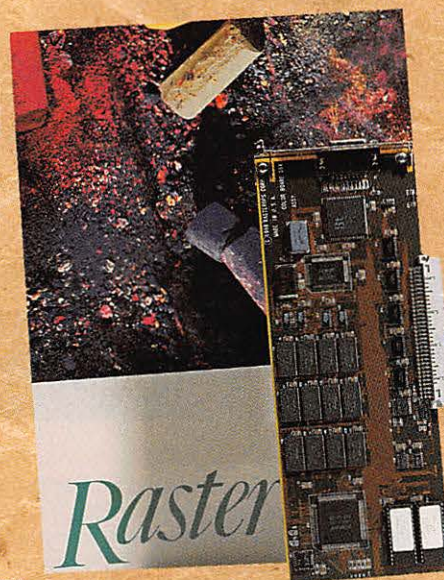
#02885 Xceed Mac II 8-bit 13"/14"\$268
 #00607 Xceed MacroColor 30 24-bit\$488



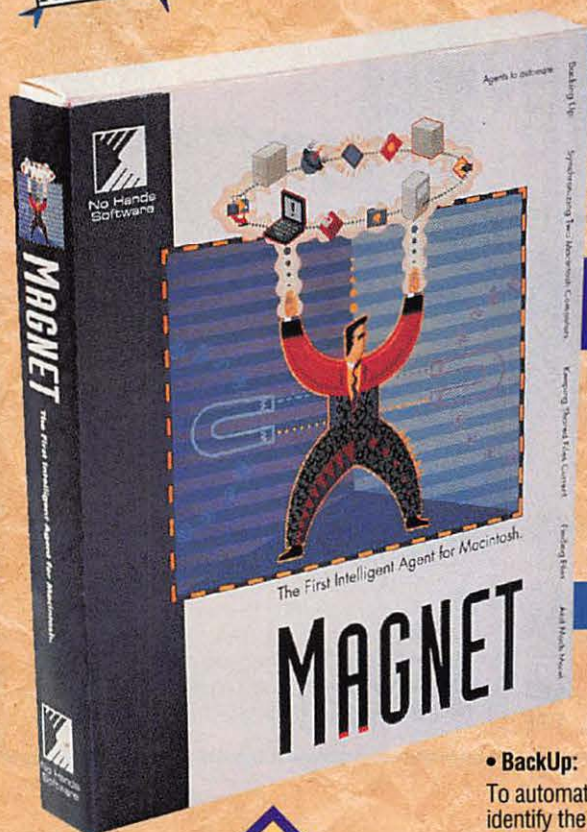
\$778

RasterOps 24STV

The 24STV is a new-generation 24-bit true-color display board capable of displaying real-time video in a screen window. The 24STV drives a 13" monitor in 1, 2, 4, 8 or 24-bit color modes at 640x480 resolution. It features a 2X and 4X pan/zoom and extended desktop, a 1-bit mask plane for overlaying windows or buttons over live video windows. MediaGrabber software (included) provides extensive control over the display and capture of a single video game or a sequence of frames for use as an animation file. RasterOps #00005



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PRODUCT**



**ATTENTION
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USERS!**

Magnet 1.0

The First Intelligent Agent for the Macintosh.

Imagine that you have your own personal assistant to synchronize the information on your PowerBook and desktop computer, and back up your hard disk after you've left work for the day. Or, an assistant to browse the network every ten minutes for an important authorization from purchasing that you've been waiting for. Magnet 1.0 delivers these powerful, but easy-to-use assistants and more to Macintosh users running System 7.

\$88

Agent Technology— The Power Behind Magnet 1.0

Using revolutionary agent technology, Magnet 1.0 lets you create "personal assistants" or agents to automate a wide range of repetitive file-related tasks. Agents act like magnets, attracting files to their location at pre-specified times. To create an agent, you simply tell Magnet what files to find, what to do with the files (e.g., copy, move or alias) and when to do it. Best of all, agents are ultra-easy to use. There's no scripting, you simply point and click! Once established, agents will run invisibly in the background, pulling files to the desired location, at the scheduled time, without further supervision.

Magnet Does More So you Can Get More Done

Magnet's value comes from the program's ability to automate so many different tasks. It's like having a whole group of file-related utilities wrapped into one program. Here's a list of some of the important tasks Magnet can automate:

• BackUp:

To automate file back up with Magnet, simply identify the files you want to back up and when (at shutdown, when a server or SyQuest is mounted or at regular intervals on a daily or weekly basis) and the agents will take care of the rest.

• Keeping Shared Files Current:

By taking advantage of System 7's FileShare, you can create agents to search for new or updated files on each node of a network, and retrieve the most recently edited copy to your desktop computer.

• Background Browsing:

You can create Magnet agents to cull through this voluminous network of information to find and retrieve what is important to you. And Magnet will browse in the background while you work.

• Personal Filing Assistant:

Magnet acts like a personal filing assistant, periodically cleaning up the desktop and putting files away according to your directions.

• File Find and File Management:

Magnet's powerful search engine—essential to creating agents—is a valuable utility on its own. Magnet performs multi-attribute searches of local volumes three times faster than the System 7 Finder and ten times faster across network volumes, all without using indexes.

No Hands Software #05899

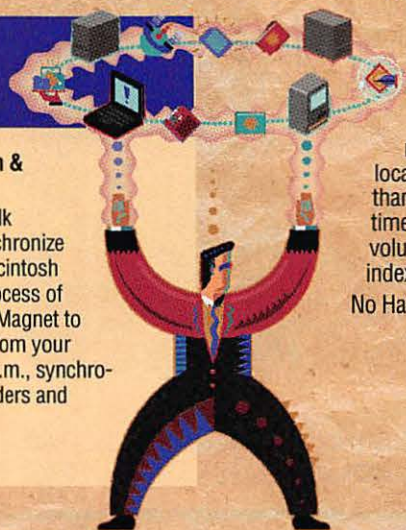
With Magnet, Synchronization is as easy as Pointing to Two Folders

• Synchronization:

When a PowerBook owner begins working on a file that also exists on his or her desktop Macintosh, the latter file immediately becomes out of date. The challenge of keeping folders on two Macintosh computers in sync has been identified by Apple as the number one problem of PowerBook users. Magnet's synchronizing agents ensure that no critical information is overwritten, even if files in both locations have been changed since the last time the synchronizing agents ran.

• Remote File Synchronization & Retrieval:

Magnet users running AppleTalk Remote Access can easily synchronize information on two remote Macintosh computers or automate the process of downloading remote files. Set Magnet to access your home-base Mac from your PowerBook every night at 11 p.m., synchronize your work-in-progress folders and log off—all automatically.



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Create Amazing Artistic Effects with Aldus Gallery Effects



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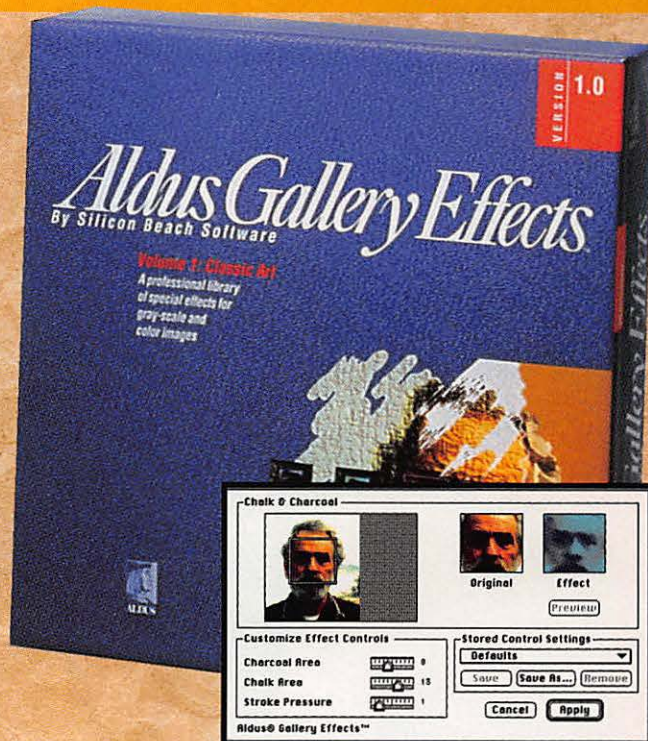
Aldus Gallery Effects

Winner of MacUser's MacEddy Award for Best Visual Resource, Aldus Gallery Effects is a unique library of artistic effects that automatically turns grayscale or color scanned photographs and other bitmapped images into spectacular, breathtaking works of art. Gallery Effects is a "must have" for anyone using a scanner or doing desktop publishing, graphic design or presentations. Sixteen "master effects" are included.

And there are thousands of variations from each master effect! Each of the sixteen master effects has individual controls to let you customize the effect. For example, the Watercolor effect has controls to adjust the brush detail, the shadow intensity and the texture level.

Gallery Effects allows you to save up to 25 settings per effect, so you can preserve the fruits of your creative vision to use again and again. Achieve visual impact and a consistent look throughout a document by applying the same effect to every image. You can also apply multiple effects to a single image—the possibilities are endless.

Works directly with programs like Adobe Photoshop, Aldus SuperPaint 3.0 and Fractal Design Painter, or as a stand-alone application, or even as a DA. #04121



Here's What The Experts Are Saying

"Gallery Effects lets the artist in all of us blossom"
— *InfoWorld*

"This is one tool everyone will want..."
— *Business Publishing*

"Aldus Gallery Effects: Art made easy."
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Master Effects

- Charcoal
- Dark Strokes
- Fresco
- Mosaic
- Craquelure
- Spatter
- Chrome
- Dry Brush
- Poster Edges
- Smudge Stick
- Film Grain
- Ripple
- Chalk & Charcoal
- Emboss



• Graphic Pen



• Watercolor

Key Features

- Artistic effects
- Save up to 25 settings per effect with each document
- Intuitive control settings
- Interactive visual previews with movable viewing rectangle
- Plug-in filters for graphic design
- Stand-alone application
- Industry-standard file formats
- Brightness, contrast and color balance controls

Benefits

- Transform scanned photographs and other bitmapped images into fine art
- Custom settings can be applied to later images for consistent and reliable results
- Easily customize each effect for thousands of variations to attain the results you want
- See results before you apply them, saving time and encouraging experimentation
- Apply the effects direct from within graphics programs
- Open images, apply the effects, then save and print the results without any other program
- Work with high-quality image files from popular graphics programs
- Improve the quality of your image before applying any effect

UTILITIES

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LETS YOU FIND THE PROBLEM



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Snooper
#05025 ✓ ✓
Snooper w/NuBus Card
#05026 ✓ ✓ \$164

Diagnostic Software for Macintosh

The next time you see a 'sad Mac' on your screen or your Mac's performance isn't up to par, **DIAGNOSE FROM YOUR DESK** with SNOOPER, the revolutionary new standard for Mac diagnostic and testing tools. SNOOPER performs a comprehensive suite of tests, **CHECKS ALL YOUR HARDWARE** and identifies any problems. And the same SNOOPER software runs on all Macs. SNOOPER is easy to use and saves time and money. If you already own Norton Utilities, complete your Mac utilities with the hardware diagnostic.

VIDEO TESTS • BENCHMARKS • LOOPBACK CONNECTORS • RAM TEST • SYSTEM TESTING
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Get the Most Out of System 7 With Super 7 Utilities

1 Mighty Menus:

Are tear off menus which are available to you from any application including the Finder.

2 Printer Picker:

You'll select your printers from one, handy pull-down menu.

3 Super Comments:

Displays Get Info comments in Open dialogs and lets you create Get Info comments in the Save and Save As dialogs.

4 Desktop Extras:

Allow you to move or copy a file, folder or group of files and folders to a destination folder without opening up all the folders, thus saving time and eliminating desktop clutter.

5 Trash Alias:

Automatically deletes aliases of applications, files or folders when those files are emptied from the trash. This utility alone can save you hours of frustration and confusion.

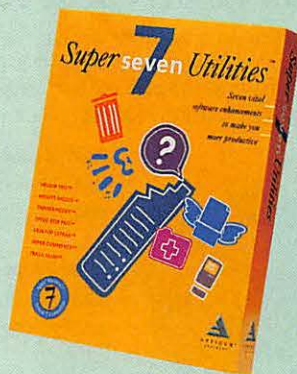
6 Helium Pro:

Lets you toggle Balloon Help on and off with quick keyboard commands.

7 Speed Beep Pro:

Allows you to customize the warning tones generated by your Mac.

Environmentally-Responsible Software: Atticus Software is one of the first companies to provide a return envelope so that customers may return the folding box and cardboard liner for re-use. Extra consideration has been given to the package to minimize waste. All materials are recyclable.

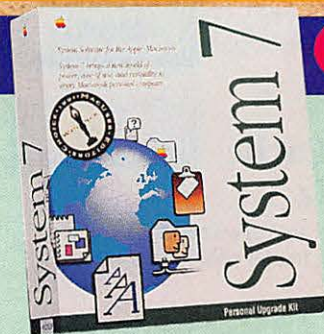


Super 7 Utilities.....\$62

This collection of seven vital performance enhancement utilities exclusively for System 7 makes your Mac more powerful and productive than ever. Each utility is easy to install and use. Atticus Software #05679

Atticus Software provides FREE and unlimited technical support for registered users. Support personnel can be reached via telephone, fax and America OnLine and CompuServe information services.

7 Super Reasons To Switch To System 7



System 7.0 Personal Upgrade\$78

#05433

1 Multi-tasking:

If you haven't been using MultiFinder, the gentle push of System 7 will introduce you to the world of doing two or more things at once. With System 7 you can always open more than one application at a time!

2 Publish and Subscribe:

"Publish" part of your document (graphic, chart, text...) to one or several other documents. When you change the original, the others will update automatically!

3 File Sharing:

If you're part of a network, you can share any folder or volume on your hard disk with other users—without using a dedicated server!

4 Better Font Handling:

Apple's new scalable-font technology is now built into every Mac, giving users the benefits of smooth type at sizes from 1 to 32,768 points, on-screen as well as on paper.

5 Aliasing:

Imagine that you could keep every file from every disk, cartridge and network server you have access to—on *your* hard disk. Imagine that you could arrange your work by date, topic, application, file name—all at the same time.

6 Finder Windows:

Organizing and accessing files is *much* easier with System 7.



Super 7 Utilities • System 7—Bundle

Now you can purchase both super-productive programs for one incredible low price. If you're not running System 7 and Super 7 Utilities, you're not getting the most from your Mac. This offer will last for a limited time, so order today! Our Mac sales advisors are standing by at 1-800-248-0800. #05758

7 Balloon Help:

Point to any element in any application and click. Balloon help tells you what it is and how it works!

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Universal PowerCache Accelerator

Spend more time working, less time waiting. The PowerCache gives you the speed you need. It offers the best combination of blazing speed (up to 3 times faster) and low cost. Rated as the best accelerator by leading industry editors, it's the only accelerator guaranteed 100% compatible with all software and hardware—even at full speed! The universal PDS design supports over ten different Mac platforms (inexpensive adapter required for non-Ilci installations). ✓✓



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#04323 without 68882 \$598 ✓✓

40MHz PowerCache

#04319 with 68882 \$818 ✓✓
#04320 without 68882 \$998 ✓✓

50MHz PowerCache

#04322 with 68882 \$1448 ✓✓
#04321 without 68882 \$1178 ✓✓

Cache Adapters \$44

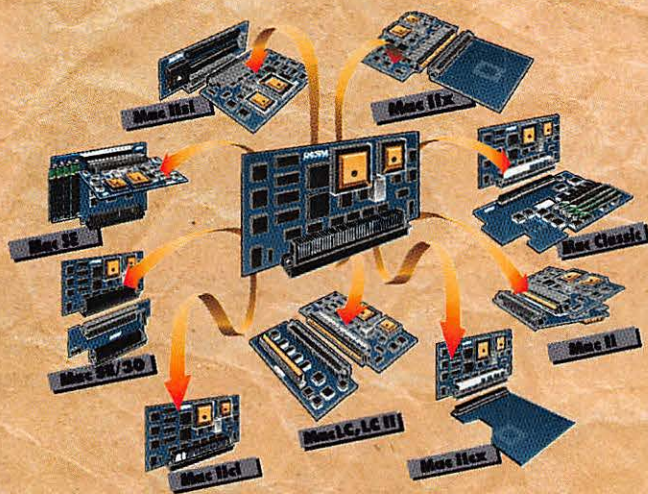
#04708 Cache Adapter SE/30 ✓✓
#04709 Cache Adapter II ✓✓
#04710 Cache Adapter Iix ✓✓
#04711 Cache Adapter Ilcx* ✓✓
#04549 Cache Adapter LC ✓✓
#04707 Cache Adapter Ilisi ✓✓
(no adapter needed for Ilci)

*Ilcx price includes socket installation

\$99

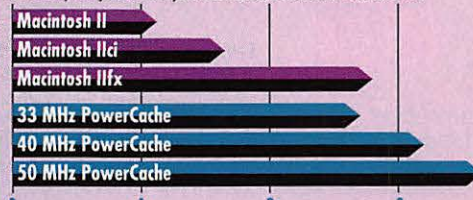
UPGRADE

to 68040 performance. Buy a 50MHz Universal PowerCache w/68882 before November 31 and upgrade to Daystar's new 33 MHz 68040 accelerator any time during 1993. Direct from DayStar



HOW MANY TIMES FASTER DO YOU WANT TO GO?

Get the speed you need in your SE/30, LC, LC II, II, Iix, Ilcx, Ilisi, or Ilci.



All speeds are shown in times faster than a Mac II. Performance gains are averaged from standard Mac applications.

NEW PRODUCT

SE 30 PowerCache 33/40/50MHz

Now you can have it all! The new SE/30 PowerCache offers blazing performance, and it leaves your PDS connector free for other expansion cards. Plus, DayStar will even install it... FREE!

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Lab Notes

Stretching a PowerBook's Battery Life

BY MARK HURLLOW

IN THE COURSE OF TESTING APPLE'S new notebook computers and comparing them with older PowerBooks (see "New PowerBooks: The 145, 160, and 180" and "Apple's Dynamic Duo," this issue), I got a rude awakening. After less than 45 minutes of use, my PowerBook 170 battery suddenly went kaput—so much for the two-hours-of-use theory. While many new battery-stretching technologies are being developed for future generations of Macintosh notebook, there are also a number of techniques that PowerBook (and Duo) owners can use now to squeeze as much as an extra hour or so from their batteries.

Running Low and Slow

POWER CONSUMPTION is proportional to processor speed; the slower the speed, the less power is consumed. The transistor inside the microprocessor consumes the most power when it's switching off or on. When the processor slows down, less switching occurs, lowering the chip's overall power consumption. All PowerBooks (and Duos) except the 100 and the 140 have a battery-saving mode called Power-Saver, under the Battery DA, which drops the processor's speed from 33MHz or 25MHz to 16MHz—fast enough for most applications.

Connectix PowerBook Utilities (CPU) from Connectix Corporation (415/571-5100, 800/950-5880; fax 415/571-5195) gives you the most control over power consumption—more than Apple's own Battery DA. For example, Connectix PowerBook Utilities gives you a better indicator of the battery's charge.

The PowerBooks' and Duos' Portable control panel has a Rest feature, which puts the processor in dormant mode after 2 seconds of inactivity. After 1/60 of a sec-

ond, the processor wakes up and looks for events waiting to be handled (such as keyboard input or mouse clicks); after another 2 seconds of inactivity, it goes back to sleep again, repeating the cycle. However, be aware that the Rest feature might slow down an application when it is doing useful work. CPU lets you customize the rest period to suit your own needs.

Power consumption also varies with the input voltage to the processor. All current PowerBook and Duo processors run at 5 volts. A reduction to 3V (equal to the voltage of the Intel and AMD 80386SL processors) would cut the processor's power consumption between 30 percent and 50 percent.

By the mid-1990s, we can expect 2.4V microprocessors and associated chip sets, which will decrease power consumption by another 20 percent. Motorola is said to be working on a low-voltage 68040 chip, which should be available soon. Reducing the voltage provides an added benefit: since low-voltage chips do not heat up as much as those running at a higher voltage, low-voltage chips have a longer life span.

ducing the voltage provides an added benefit: since low-voltage chips do not heat up as much as those running at a higher voltage, low-voltage chips have a longer life span.

The Miniaturization of Mass Storage

JUST AS VOLTAGE AFFECTS THE processor's efficiency, it's also an issue with hard drives. In the near future, drives will be available with lower-voltage options, most likely a 3V/5V hybrid. (We probably won't see a drive that's completely 3V-driven, since spinning up the platter would require more power than a 3V source could supply.)

The size of a hard drive is also closely related to power consumption. Reducing the size of the platter (and thus its weight) continues



HANK OSUNA

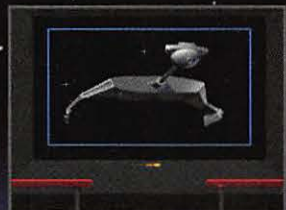
FROM THE MAKERS OF AFTER DARK

STAR TREK[®] THE SCREEN SAVER

Captains Log: Stardate 1992



On our mission to prevent phosphor burn-in...

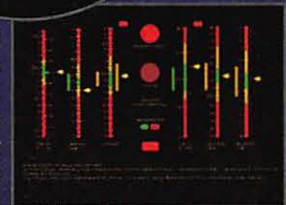


...we found ourselves surrounded by Klingons!



I asked Mr. Spock and Dr. McCoy for a full diagnosis.

Bones said the problem was burn-in, and a new screen saver was the answer.



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nce upon a time, all faxes looked the same. *Bad.* But with the Silentwriter® Model 95fx multifunction printer/fax, nothing gets lost in the transmission. Imagine PostScript™ language-quality *faxes* from your printer. It's no fairy tale. Now you can send and receive documents in all their original glory. You'll see beautiful fonts and graphics with none of the dirt and glitches, the jaggies and imperfections, that can turn a wonderful story into a tragedy. Why send a facsimile when you can send an original? Get the NEC Silentwriter Model 95fx multifunction printer/fax and live happily ever after.



The End

Actual facsimile generated from a Silentwriter Model 95fx.



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means less energy is required to spin the platter; thus less power is consumed. For example, the PowerBooks have a 2.5-inch drive, which uses considerably less power than the old Mac Portable's 3.5-inch drive. Even smaller drives are now available. A 1.8-inch model consumes less than half the power required for a 2.5-inch drive. Even more frugal is Hewlett-Packard's 21MB 1.3-inch Kitty Hawk, which weighs less than 1 ounce and consumes only an eighth the power required by a 2.5-inch drive. Although not yet available for the Mac, within a year or two the Kitty Hawk may debut in a SCSI version with a higher storage capacity.

A future option for mass storage—either as an alternative or as an addition to a hard drive—may well be flash memory, nonvolatile memory that's similar to SRAM (static RAM). A flash memory card would consume 20 percent less power than the Kitty Hawk. Unlike SRAM, flash memory requires no battery backup and, because its silicon area is a quarter the size of similar capacity SRAM, flash memory is less expensive. Its main disadvantage used to be its 12V/5V power requirement—12V is required for writing and erasing the memory. However, 5V flash memory cards with 2.5MB to 40MB capacities are now available, and 3V cards should be soon. As a mass storage medium, flash memory is much more expensive than a hard drive. But just as the cost of RAM has plummeted to a record low, flash memory prices should drop dramatically within the next few years.

Improved Battery Technology

ANOTHER IMPROVEMENT YOU CAN EXPECT to see in the near future lies with the power source itself—the battery. Nickel-cadmium batteries (NiCd) have been the batteries of choice for notebooks and portables, but the NiCd does have a minor flaw: a phenomenon known as *memory effect*. If the battery is not sufficiently discharged before being recharged and is repeatedly discharged to that same insufficient level, eventually the battery may send slightly less voltage to the PowerBook when it reaches that level. Fooled into believing that the battery doesn't have enough operating power, the PowerBook warns that it's time to recharge and threatens to shut down. Much more prevalent with older NiCd batteries, memory effect rarely occurs with PowerBook NiCd's because of their improved technology. Still, to ensure maximum usage, you should sufficiently discharge your battery every few months by using the PowerBook in the least-efficient mode (turn the brightness all the way up, keep the disk drive spinning, avoid sleep mode).

Or use CPU's Quick Discharge feature, which drains the battery as quickly as possible while you're working.

The nickel-cadmium's new competitor is the nickel-metal-hydride (NiH₂) battery, which is used in the PowerBook Duos. Apple claims an NiH₂ can last up to four and one-half hours. Although the NiH₂ is more expensive than the NiCd battery and requires a more-complex recharging circuit, it has a better power/weight ratio than the NiCd.

The Future Looks Brighter

BACKLIGHTING THE POWERBOOK'S screen is what draws the most power. To minimize power consumption, keep the screen dimmed to a comfortable level. Both CPU and the shareware utility Backlight Control give you control over the backlight setting. Avoid desktop patterns with many black pixels or solid dark areas, which require more backlighting. Before you turn up the brightness, try adjusting the contrast instead.

The higher the efficiency, or brightness, of the PowerBook's fluorescent tubes, the less power is needed to light the screen. Brightness capabilities have improved dramatically since 1990, when the brightness level of a single fluorescent tube was only 140 candela per square meter (Cd/m²). Only two years later we have now seen brightness levels as high as 450 Cd/m². Landmark Technology, a company based in San Jose, California, specializes in backlighting design and already has 700-Cd/m² fluorescent tubes working in its lab.

A Lease on Battery Life

LOW-VOLTAGE PROCESSORS, FLASH memory boards, and brighter LCD panels may be the hope of the future, but they won't help you get more juice out of your current machine. So what else can you do to prolong your battery's life right now?

One power-saving technique is to eliminate as much disk access as possible. Use a RAM disk—preferably one that maintains its content when you shut down the computer; and avoid virtual memory—it requires excessive disk access to swap data in and out of the hard drive.

Remember to quit your telecommunications program when you're not using it; the modem port—like every other PowerBook component—is a power consumer too.

If you're using your PowerBook in battery mode, put it to sleep whenever it's idle for more than a few minutes.

And finally, use your AC adapter as often as possible; you'll be guaranteed a charged battery when you're ready to take it on the road. **m**

Circle 283 on reader service card

BEHIND THE SCENES AT MACROMEDIA



Young Harvill—artist, holographer, virtual reality inventor, and Director of 3D Product Development—talks about Macromedia's newest 3D modeling package and how it lives up to the design team's original ideals.

What did you set out to do in designing MacroModel?

We wanted to create a modeling environment that was as easy to use as Swivel 3D, as fast as Swivel 3D, but very accurate and capable of doing anything from concept design through CAD.

We also wanted to build a core technology that would last five to ten years, that would be a key part of the technical equity of the company.

How is MacroModel more compatible with CAD than other modelers?

The accuracy is very important. So are CAD functions like 2D and 3D snapping, being able to snap to exact geometry.

That's a main difference between Swivel 3D and MacroModel. With Swivel 3D, pretty much all the modeling is approximate—it's great for presenting concepts—but with MacroModel you can actually start with a plan or drawing and by typing in numbers and snapping to points, come up with an exact representation of your object.

That you could then use to pass on to manufacturing?

Yeah, you could use it to develop a comprehensive set of drawings for engineering or to go out through DXF to a CAD/CAM environment.

What do you mean by 2D and 3D snapping?

That MacroModel is very similar to [Adobe] Illustrator and other illustration programs, in that you're always drawing on a 2D surface that's called the working plane. Most often that plane is flat on the screen, but you can place the plane anywhere in the world, say at an angle or on top of a building, and extrude a water tower, or whatever you like, in that plane.

The plan was to give people who are familiar with 2D CAD and illustration programs all of the tools they're used to using on 2D surfaces, but once they start extruding or sweeping they can jump off into the third dimension.

I think we've been pretty successful at it.

Now, for rendering, you'd really want to use Three-D or MacRenderMan, right?

That's true. MacroModel's rendering is what I'd call a draft-to-good quality rendering. For the real high-quality photorealistic rendering you'd want to go to [MacroMind] Three-D for animated rendering, or to [Pixar] MacRenderMan for still-life rendering.

You hear a lot about modeling speed. How fast is MacroModel?

Well, one of the main things we tried to achieve was to have smooth-shaded hidden-surface images of objects be updated in a reasonable time as you model them. Basically we had to write a highly optimized renderer.

Just to give you an idea, right now we're essentially comparable with the speed of Swivel 3D, so we're rendering about 1,000 polygons per second on a Iliac. And on a Quadra, just in terms of the interactivity and responsiveness of the edit, we're approaching a Silicon Graphics Personal IRIS kind of speed.

So Swivel 3D and MacroModel are both modelers with roughly the same speed...

Yeah, that's right. But they're pretty much different tasks—going from concept modeling [Swivel 3D] to having a real numerical model with curved surfaces [MacroModel] to prepare for CAD or working drawings, or to use in animations.

What we're seeing is that people who want to graduate from display modeling to models that have real dimensions—if they're trying to model real products, or extremely large worlds, if they need curved surfaces—then they should move up to MacroModel.

And MacroModel does spline-based modeling rather than polygons. What's the advantage?

Polygons are fine to model flat surfaces. But if you have objects with curved surfaces, the advantage to representing them with curved surfaces—splines—is that you can render at various levels depending on how much time you have or how much update speed you want.

In the long run, representing

curves as polygons is just an approximation. It's not accurate.

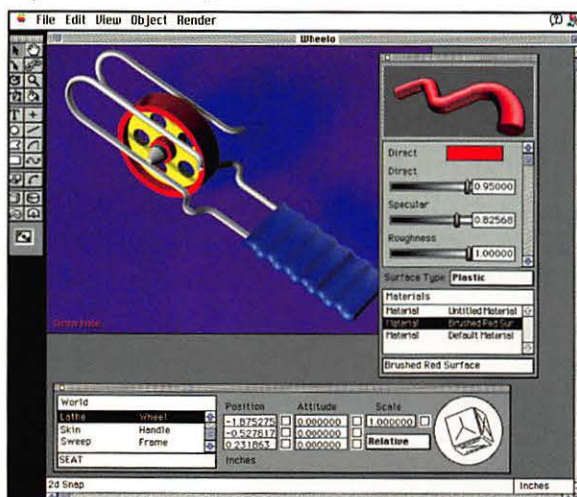
What do you love the most about MacroModel?

The thing I enjoy as a user is that when you create an object, MacroModel remembers how you created it. So if you make a Bezier line or put out a letter that has an Illustrator-like outline and then extrude it, MacroModel doesn't forget that you extruded it from this profile.

So you can go back and edit the original object and the extrusion changes too?

That's right. That was a goal we had at the beginning—and we kept it for all the different object types—that you can go back and edit the defining geometry and get updates in a reasonable time.

Other things I like are all the neat user interface things like the track ball interface, the browsers, and the numerical updating. I think it worked out really well. I think people are going to be jazzed.



Does anyone else do all this?

They're beginning to. But this is the sort of stuff you have to do at the beginning—you can't go back and add it on. So I think a lot of our competitors, once they see this, are going to have to go back and rewrite everything.



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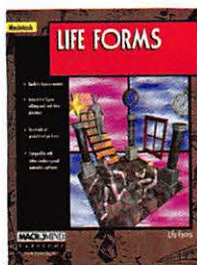
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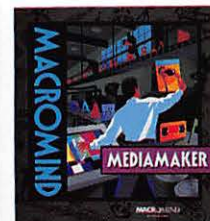


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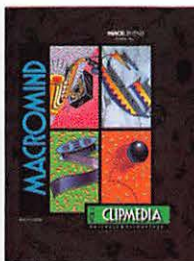


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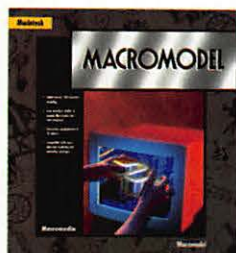


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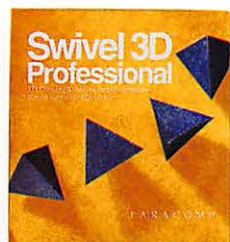
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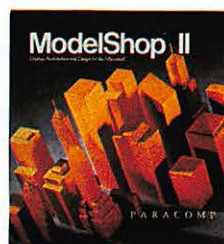
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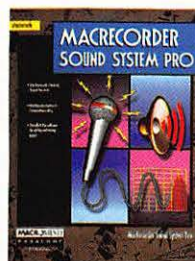
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An Interview with Manny Menéndez

BY JERRY BORRELL

MANNY MENÉNDEZ, THE president of Deneba Software in Miami, was born in Cuba. In 1962, at the age of four, Menéndez and his two-year-old sister emigrated alone to the United States because Cuban officials refused to allow his parents to leave the country. Eventually his mother left Cuba on a plane; somewhat later his father escaped from Cuba on a 16-foot sailboat. After the family was reunited, they moved to Puerto Rico, where Menéndez grew up. At age 18 he moved to Miami, where he finished high school and began college. There he studied electrical engineering.

MW How did you meet your partners?

Menéndez While working at Kendall Computers in Miami I met Joaquin de Soto and George Miranda. They were in college, too, selling part-time. We became friends. Computers were a hobby for all of us—we sold computers, we owned them.

MW How and why did you get started as a developer?

Menéndez The three of us had Macs early on and saw a need for software, but we saw no software coming. At Kendall, we saw betas from everyone who was writing software. People called us and asked for spell checkers, databases. By 1985 there was only a handful of software packages available.

MW When did you actually start development on your first program?

Menéndez Beginning in March of 1984, we worked on a spell checker. The problem was that you had to buy a Lisa. There were no compilers or developer tools that ran on the Macintosh at that time. You had to buy a Lisa and develop on it for the Mac.

MW Then how did you develop your first product?

Menéndez In the beginning of 1985 we were using Forth, since we had no money for three \$10,000 Lisas, which slowed us down. Then Bill Duvall released Consulair C. We were really ex-

cited. We bought the compiler for \$500 and wrote the first program that went to market using it.

MW Which was?

Menéndez MacLightning. In January of 1986. Luckily for us, it coincided with the birth of the Mac Plus and SCSI, which coincided with the rebirth of the Mac. We showed MacLightning at the second Macworld Expo, in San Francisco. We were in the Apple booth. The product was a success; it was well received. We sold 100 copies at the show. All we had. We gave a copy to John Sculley, who came by the booth.

MW So MacLightning was written by the three of you?

Menéndez Right. Each of us wrote some aspects of the software. It was a team effort.

MW How did you decide to market the software?

Menéndez In November of 1985 we were looking for options to market it. A group in Miami had been trying to launch a software product, unsuccessfully, and we met them at Kendall Computers, where we all still worked. Their product was going under. They had a place, phone, contact with developers and distributors, but they didn't have a product.

MW So how did you decide to work with them?

Menéndez They needed a product; we needed a publisher. So we signed an agreement that would give them the rights to market our software. It really worked out well. They sold lots of copies—at the end of 1986, over 50,000 copies. That is a lot of software for a Mac product even today. Apple bought 19,000 to sell as a bundle to all Apple University Consortium schools.

MW What then?

Menéndez We worked at Kendall Computers up to May of 1986. Then we said, OK, we have to decide to go full-time to write a new version of MacLightning and do new products. The competition was stiff. By mid-1986 we had nine competitors. Still, MacLightning held on, actually led the market. In August of 1986 we had our own booth at the Boston Macworld Expo. Target Software, the company licensed to market Deneba's software, and Deneba shared the cost of a booth. We showed MacLightning 2.0 and Voilà, an outline processor.

By the end of 1986 we had MacLightning, Voilà, and started to advertise Memorandum. At the same time as we were releasing utilities and desk accessories, George was working on Canvas. In October of 1986 we leased our first office, near the Miami airport. It was a big office with just the three of us in it. Before, we had worked in our homes, shifting from one to another so that we could work at home but together.

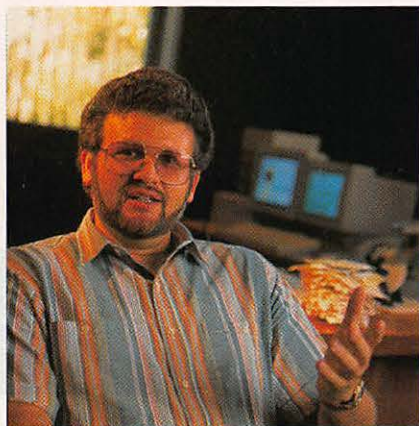
MW And the big money started rolling in?

Menéndez At the end of 1986. We were very happy. The products were selling. We were coming out with new products, new versions, and we were independent. We had been very careful in signing with Tar-

get. We could decide what product to develop. Target had the first right of refusal on anything we did. If they decided not to publish it, then we could do anything we wanted. They took care of sales, marketing, and business and all else. The money was coming in. Hundreds of thousands in royalties for Deneba Software. We hired some office staff.

MW When did the problems start?

Menéndez At the beginning of 1987 things started to go sour. The guys from Target were making all their money from



PHOTOGRAPH BY JAMES KAMP

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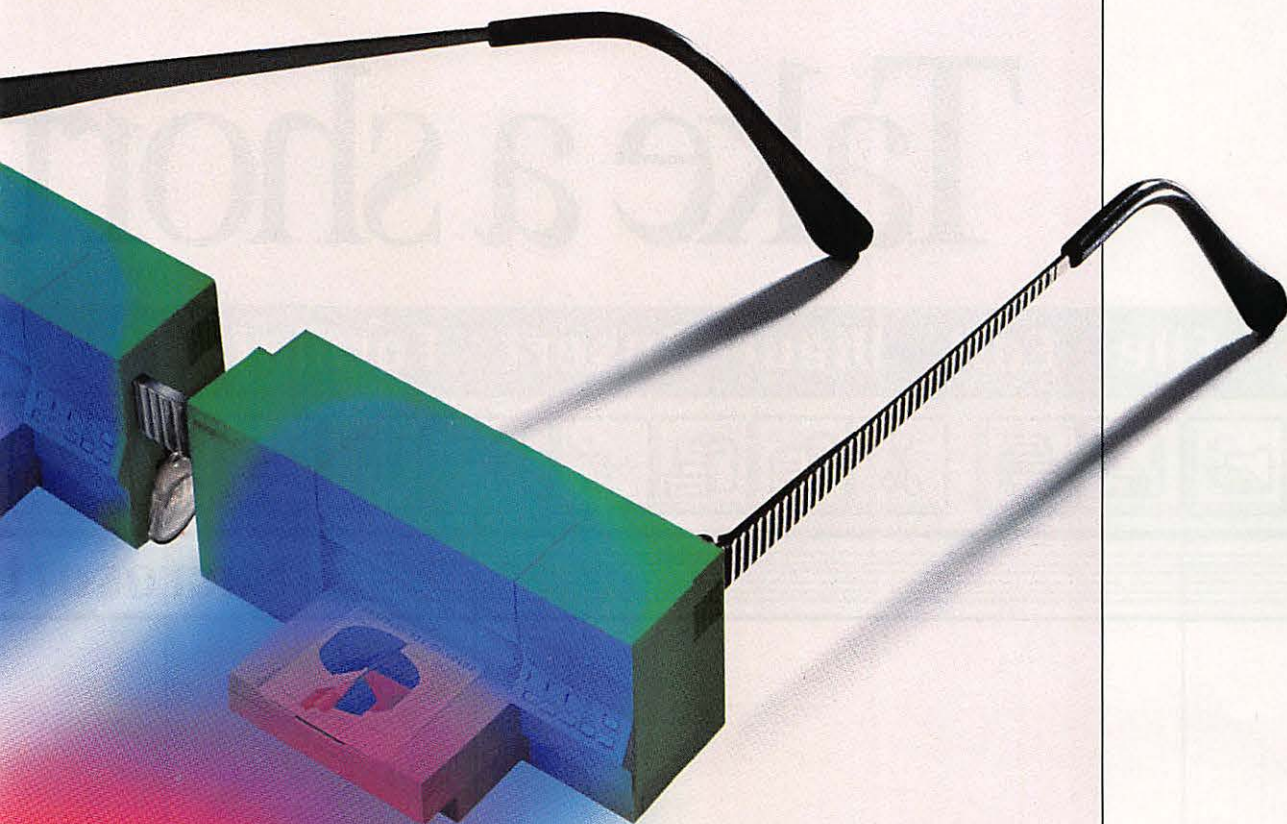


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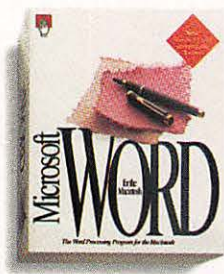


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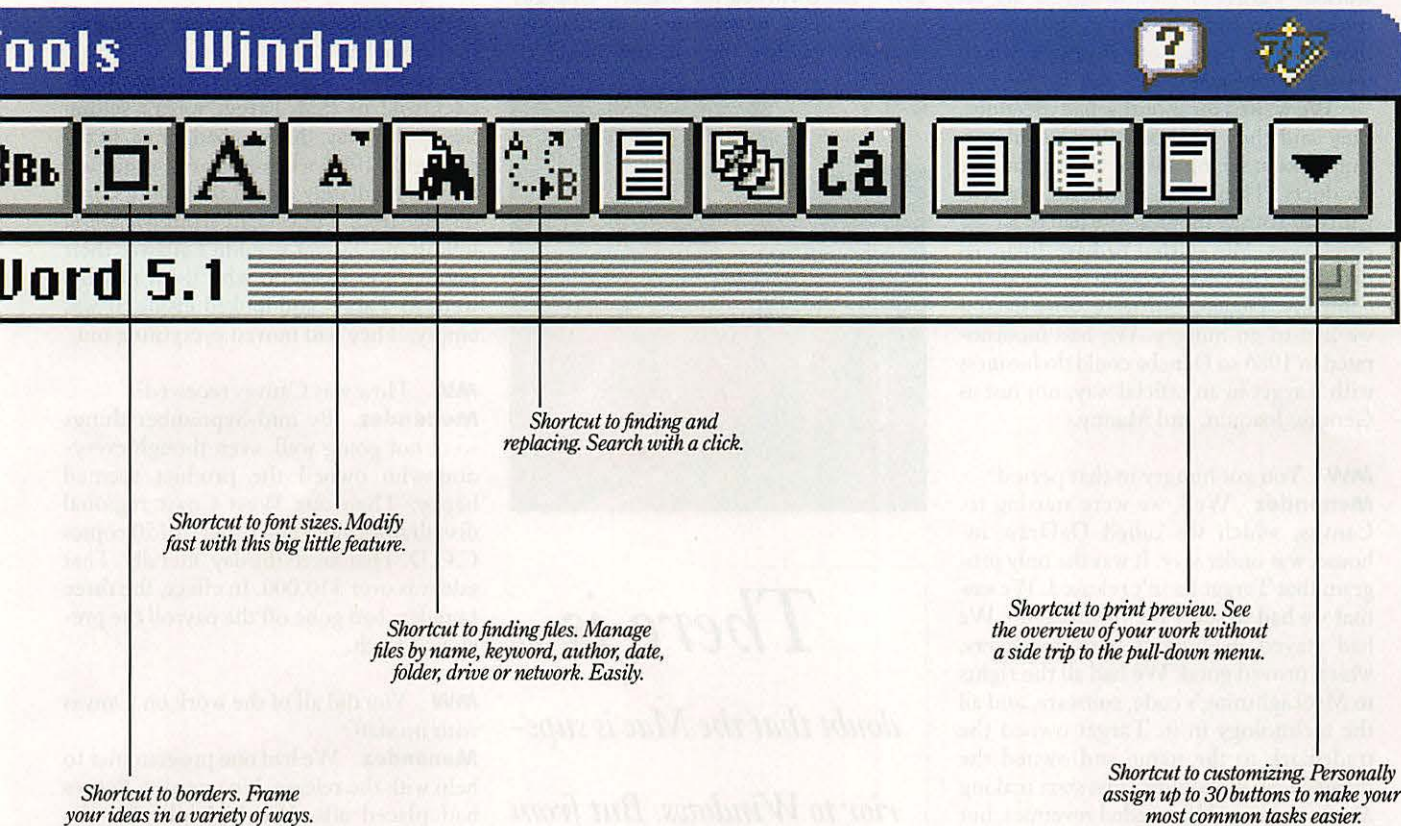
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the sales of our products. They had discovered a desktop publishing package and secured the rights to market it. They had big plans, these guys; Target liked everything big. We knew the developer of that product. He seemed like a good guy. That product, then called Scoop, eventually became Publish-It [published by Time-works]. Target started to spend big on trade shows and ads, and in the process they stopped paying our royalties, which was a fatal mistake.

We waited for months, had meetings, they said they had cash-flow problems. But we kept seeing ads for Scoop and our products. They were gambling, we felt, with our royalty monies. We had to lay off employees. We started to have financial problems, but we decided to keep the company, Deneba Software, alive even if we had to go hungry. We had incorporated in 1986 so Deneba could do business with Target in an official way, not just as George, Joaquin, and Manny.

MW You got hungry in that period?

Menéndez Well, we were starting to. Canvas, which we called DaDraw in-house, was under way. It was the only program that Target hadn't released. We saw that we had to sever the relationship. We had stayed in contact with reviewers, which proved good. We had all the rights to MacLightning's code, software, and all the technology in it. Target owned the trademark to the name and owned the manuals. So we couldn't just start making MacLightning. We needed revenues, but we had to rename existing products and write new manuals first. We lost all of the name recognition for the products. Our only immediate hope was Canvas.

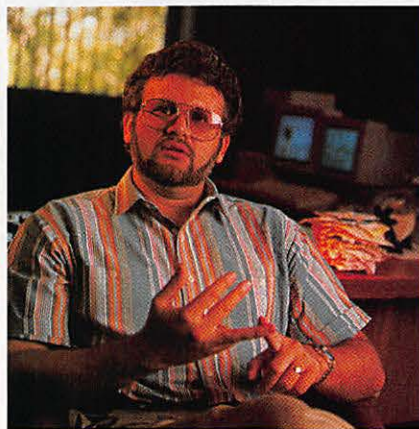
MW What did you do about Target?

Menéndez In May of 1987 we filed suit against Target to obtain royalties. We were owed over \$200,000 for five months of 1987 sales alone. The product was selling well, but Target was fixed on competing with Aldus, in making tens of millions of dollars, not just millions. So we decided to release Canvas ourselves. To register the name, and release and market it with the money we had left. We decided to go for it—marketing, sales, advertising, packaging, design, shipping, tech support, accounting, sales support, the works.

MW When did you start?

Menéndez In August of 1987 we shipped Canvas 1.0. We put an ad in *Info-World*, the only established weekly that covered the Mac, and sold 50 copies in prerelease sales. [Silicon Beach Software founder] Charlie Jackson was one of the people who had to pay full retail.

Joaquin and I went to the August 1987 Boston Macworld Expo to meet with dealers and distributors. No dealers would carry the product. We couldn't afford a booth. Apple wouldn't let us in their booth. There was that attitude of, Who is Deneba? On top of that, Canvas was nice, more than nice, it was great, but Super-Paint had cornered the market. One guy who wrote a newsletter said that we shouldn't publish the product ourselves,



There is no doubt that the Mac is superior to Windows. But from a practical standpoint, Windows does the job and does it well for most people.

that we should find a publisher. It sounds ludicrous five years later.

At the time, we had the rights to a total of six products but only had the money to release one product—Canvas. We decided to do that and then to re-release the other products with the profits. Our agreement said that if Target didn't pay our royalties, they couldn't sell our software.

MW What happened with the DTP program, Scoop?

Menéndez There were delays. It was buggy. Eventually the developer got shafted, like us. Target raised \$500,000 in

venture capital in the summer of 1987. About that time you probably remember seeing an eight-page ad spread in *Macworld* and *MacUser*. The product was panned in reviews. Target had released it in a buggy state. They had had no cash coming in since May of 1987, when we terminated our publishing agreement.

MW Could you tell what was going on in the market?

Menéndez Reviews and market feedback told us that Target wasn't selling Scoop. In a way, that was bad for us. In the spring of 1988 we won our lawsuit and they immediately closed their doors. Just disappeared. I got a call from *Macworld* telling me Target wouldn't answer their phones and Joaquin, who lived nearby, went to Target and looked inside. It was empty. They had moved everything out.

MW How was Canvas received?

Menéndez By mid-September things were not going well, even though everyone who owned the product seemed happy. Then one West Coast regional distributor called and ordered 150 copies C.O.D. That saved the day, literally. That sale was over \$10,000. In effect, the three founders had gone off the payroll the previous March.

MW You did all of the work on Canvas with no staff?

Menéndez We had one programmer to help with the release. No one else. But we had placed ads. We had bills for the manual, bills from the artist who designed the packaging. It was time to pay those bills. The \$10,000 kept us busy. We used that as leverage to help us with other dealers. We sold 300 copies and broke even in October. At least we paid the bills. Still, we were not back on payroll.

MW What was the big break?

Menéndez In October a national distributor placed a big order on the product. The original distributor continued to buy it, too. We all three went back on the payroll. We had debts out the wazoo. Thank God for MasterCard and Visa. Someone kept sending my wife, Lourdes, \$5000-credit-limit preauthorized Visa cards based on some mailing list. We lived off those. I lost count of how many. Five or six of them—\$20,000 in credit card debt. Joaquin and George and I, we were all in the same boat. Very dark days, and a lesson I remember.

MW Yes, there is still a feeling of that in the company, of time clocks, tough negotiations, bare bones.

continues

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Menéndez I always like to talk people down to the best price. I need to get the best deal on everything.

MW Where is Deneba in terms of sales and size?

Menéndez Last year we made \$8.4 million in sales and are projected for \$11 million in 1992. We have 62 employees.

MW How would you evaluate the company's net worth?

Menéndez Well, if you take companies similar to ours, they've sold at a price equal to 2½ to 3 times annual sales. Fox Software, Silicon Beach, Peter Norton. So we would be valued at \$24 to \$30 million.

MW How has UltraPaint done?

Menéndez Very well. We'll have the 2.0 release done for the October-November time frame. It has 32-bit color and new tools. We have to keep up with the Joneses.

MW Has Adobe Photoshop had an impact on the market for paint software?

Menéndez I see Photoshop as a product in the imaging market. Adobe pretty much owns that market. Paint, as a category of software, was on the way down before Photoshop came out. Business users began to outpace personal users of paint programs several years ago, and business users view object-oriented graphics programs as better tools for business. Of course, traditional graphic artists continue to use paint software. [Deneba's] UltraPaint is also an object-oriented graphics program.

MW Has UltraPaint done as well as you hoped?

Menéndez Not as well as we hoped, but better than competitors like PixelPaint, VideoPaint, Graphist Paint, and Cricket Paint. UltraPaint did better than Studio/8. Overall, UltraPaint is a success. We have made a lot of money from the product.

MW Is Canvas a bona fide Macintosh hit?

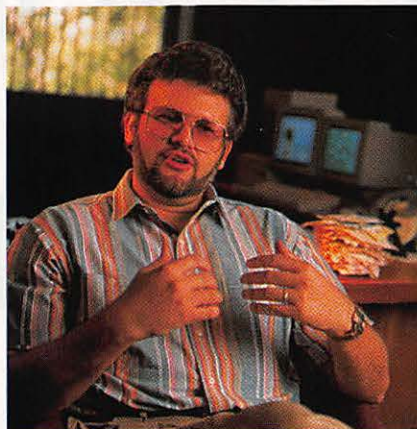
Menéndez Last year we reached the 200,000-unit mark in sales and it's still selling well. That places it right up there with a select few in the Mac market; with PageMaker, MacWrite, FileMaker.

MW What about Windows?

Menéndez I don't know the delivery date, but we've been working for the last few years on Windows. Our goal is to move our entire product line to Windows and make all of our products multi-platform-oriented.

MW Compare the Windows and Macintosh environments.

Menéndez There is no doubt that the Mac as a seamless operating system—graphics user interface is superior to Windows. From a practical standpoint, however, especially price-to-performance ratio, Windows does the job and does it well for most people. But it takes longer to get Windows installed than it does to start up on a Mac. On the other hand, in



corporate America there are departments that configure and install software.

MW What does that mean for Apple?

Menéndez Apple had to do what it seems to be doing now, being aggressive with Mac prices. For example, here on my desk is an 80486 machine with 16MB of RAM, a 256K RAM cache, a mouse, a VGA card and monitor, keyboard, and Ethernet. It's a PC clone for which I paid \$2000 retail. It compares to the Quadra 700, and in some cases is superior, but the 700 in a similar configuration would cost \$6000 to \$8000. That's a large part of why Windows is so successful. In the figures that I read, worldwide they expect 10 to 15 million Windows machines by year's end, compared to 8 to 9 million Macintoshes by year's end.

MW How important are foreign markets for Deneba?

Menéndez Foreign sales are 20 to 22 percent and growing. Canvas is in five languages in addition to English.

MW How do you rank your foreign markets?

Menéndez Japan and France are about equal. After that the United Kingdom, Germany, and Sweden. A Spanish version is just coming out.

MW What do you think about the process of product reviews in computer magazines?

Menéndez Reviews are important in

our industry, just as in any other industry. I go to reviews to buy cars, cameras, and software too. It's a painful but necessary process.

MW Why painful?

Menéndez No one who has worked for years on something likes others to find flaws in it. And there is a lot riding on reviews. There are 60-some families depending upon good reviews, not just the three owners of Deneba. But it doesn't stop there. The market has to approve of a product, too. People vote with their dollars.

MW Were there any problems with Canvas 3.0?

Menéndez Primarily with some PC import file filters—DXF, IGES. They're not really standards; that's an oxymoron for file formats. We tried to test with as many file formats as we could. But as the product was more and more widely used, flaws came out in use with obscure products or in their files. But we moved quickly to correct these problems. This will continue forever—the trouble is that there is really no file format exchange standard.

MW How is it being an Apple developer these days?

Menéndez We have a fairly good working relationship with Apple and are working with them on new technology and developments. We're realistic toward Apple. If you have something that will help them, they'll help you. If not, they won't.

MW Is that a change?

Menéndez No, that's how we've always thought of Apple. They've never really gone out of their way to help, so we've never depended upon them. As it should be. We've never been dependent upon them as many other companies have been.

MW For example?

Menéndez Claris [*Menéndez laughs*].

MW How about Apple Evangelism?

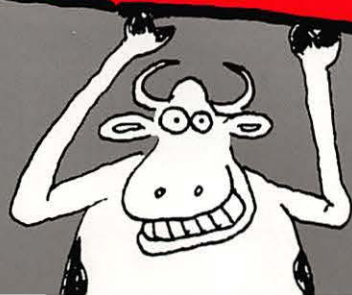
Menéndez Lots of changes there. Funny, until recently we rarely received any attention. Then Apple started to get involved with us again. It was pragmatic, to get people to support System 7.0. We've worked closely with them on the 7.0 rollout and on QuickDraw G/X.

MW What about 7.0 system software?

Menéndez It was adopted quickly. We used publish and subscribe, Apple events. All were supported by us before 7.0 shipped. Other developers didn't adopt

continues

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have a good time
while you're
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Does having a blast with your personal computer violate your work ethic?

When faced with bizarre, disturbing, yes, even sick humor, do you become confused and disoriented?

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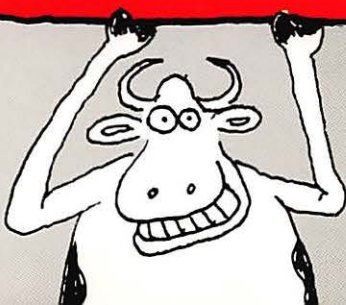
As you'll see on the back, the Amaze Daily Planners are fully functional, multi-featured, perpetual personal organizing systems.

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If you love The Far Side, you'll drool at the chance to gaze into your screen and savor a daily dose of dementia straight from the mind of Gary Larson.

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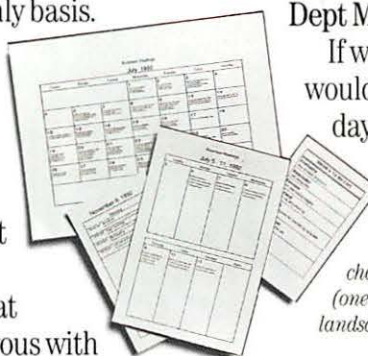
It's as easy as click and drag.

You can set audio alarms to keep from forgetting that important meeting with the Big Cheese. (Or that important rendezvous with the Main Squeeze.)

And while you're at it, you can get a graphical overview of your day, courtesy of our

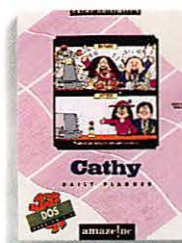
You can organize, view and print out your schedule by the

day, the week, the month or the whole year. You can edit everything—dates, times, meetings,



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7.0 features as quickly. Users adopted 7.0 much faster than the developers.

MW Yet research shows only 300,000 to 350,000 using 7.0.

Menéndez More than that. A lot more.

MW Compare that to the adoption of Windows by DOS users.

Menéndez I wouldn't compare those two. Windows filled a sore need for millions using DOS. System 7.0, relative to Windows, is marginally important compared to the need DOS users have for a graphical user interface.

MW What is QuickDraw G/X? What does it do?

Menéndez QuickDraw G/X is Apple's improved color-imaging system. It's an alternative to QuickDraw. It's very important, I think, and long overdue. I have high hopes for G/X, but I'm not sure that it will do the job completely. I always wanted to see more precision built into the QuickDraw graphics model, primarily from a collaborative point of view. Say you make a drawing in a precision draw program and want to drop it into a word processor. You want to retain the precision of the original drawing in the word processor document. There is still a question, with G/X, whether the Clipboard will resolve this problem. The cut-and-paste functions on a Mac could be as powerful as those on a Next machine.

MW Cut and paste on the Mac is not that powerful now?

Menéndez Absolutely not, from a user's perspective. I hear from users that things move around. Canvas and some other draw programs allow objects to be placed with greater precision than QuickDraw's limit of $\frac{1}{2}$ of an inch. If you save a Canvas or other draw program file as an EPS file and import it, printing is OK. But if you cut and paste via the QuickDraw Clipboard, then it's real difficult to guarantee placement or accuracy if the file is printed from another application.

MW The entire concept of modular software, software components, was popular for a while. Now no one seems to talk about it much. What happened?

Menéndez First, that is not one but many ideas. No one talks about the ideas now because reality has set in. The most we can do now is what we have in Canvas or UltraPaint. They are modular programs in the sense of being extensible.

MW What does that mean?

Menéndez Writing software from scratch in an object-oriented fashion. The

Apple II had hooks for developers to use so that people could turn the Apple II into an oscilloscope if they wanted to. Similarly, people can use *Inside Canvas*, a document that teaches programmers how to use the Canvas graphics engine. It allows users to modify the program for their own uses. In the release of Canvas 3.0 in August 1991 there was no QuickTime component, for example. Canvas's open architecture allowed us to release a QuickTime



tool when QuickTime itself shipped. This tool allowed users to run QuickTime in Canvas immediately, last December.

The main benefit is that you can buy a product now and don't have to wait years to take advantage of the latest tools or techniques. We can add a feature at a component level without waiting for a major upgrade, which is trouble for both end users and companies with products.

MW Silicon Beach was your old competitor. They seem relatively quiet these days.

Menéndez In the early days Canvas competed with SuperPaint. Now SuperPaint competes with UltraPaint. Silicon Beach sacrificed development on that product to get out SuperCard and Super 3D. Maybe that helped the owners to sell the company to Aldus, but it didn't help the products in the long term.

MW Whom do you admire the most in the computer industry?

Menéndez Bill Gates. The guy has got what it takes. He's obviously smart, he has grabbed opportunities aggressively, and he has been relentless in his pursuit of success.

MW What about products like Microsoft File and Chart?

Menéndez You can't win 'em all. The key to winning the war is not in winning every battle. Still, Microsoft may not have given up on those products just yet. Or maybe it's better to move on.

MW Do you have any products that you need to move on from?

Menéndez That's a painful question. The market for some early products, like Comment, isn't there anymore, but we're really attached to Comment. We all use it here. But it is exceedingly expensive and complicated to keep system-level utilities in the market. They screw up Apple's system software strategy. You do things that are not intended to be done, pretty wicked things [in the system software] to offer facilities to the users. Intercepting system traps, massive numbers of them. Taking the place of system resources. Trying to trick the system into thinking that something is going on when it's not. Complicated stuff. That's fine until Apple introduces new system software, in which case your methods and strategy may not work. The Apple rule of the last five years is don't do it.

MW Do you want to remain a small businessman?

Menéndez No. I want to be a very big businessman. So do Joaquin and George. But we're willing to wait. We want to sleep at night. Look at our situation. We just bought a new building for two-thirds of what it's worth, but we should have moved out of our two old buildings one and a half years ago. There are some inefficiencies in having two separate facilities for the company, with 30 people in each of two buildings rather than 60 in one building. That has psychological effects on people. You can hire better people if you are seen as a more successful company. This desk [*Menéndez stoops to drag open a stuck desk drawer*], it's hard to open, but I want to spend dollars on computers and good people, not furniture or real estate.

MW Charlie Jackson sold Silicon Beach to Aldus when his company hit \$11 million in sales.

Menéndez That's correct, for about \$24 million worth of Aldus stock.

MW Wouldn't you like to have that kind of money from selling Deneba?

Menéndez Yes, it's attractive. But what would you do with \$20 million, put it in the bank? I'm 34. George and Joaquin are 28. What would we do? Start a new company? Why not just grow this one further?

MW Because of the examples of all of the small software start-ups that don't make it.

Menéndez It's all a state of the mind. The journey is the reward. I have fun. Joaquin and George do too. We enjoy coming to work. It still feels the same. **m**

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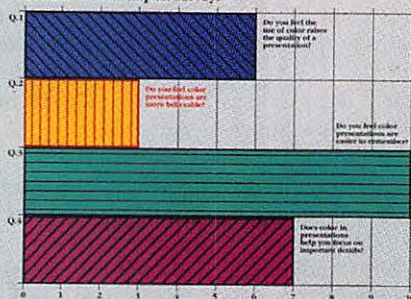
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Printed below are the results of an informal survey to determine the effectiveness of color in marketing presentations.

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Participants were asked to respond to the questions on a scale of one through ten, with one representing "no, strongly disagree" and ten representing "yes, strongly agree". The results were then tabulated and an average was generated, represented in the horizontal graph columns below.

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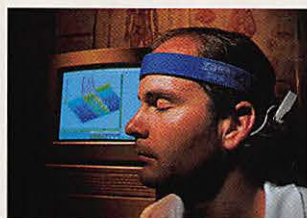
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Brain Drain

IF YOU'VE EVER wanted to get inside someone's head, the Interactive Brainwave Visual Analyzer (IBVA) could be the tool you need.

IBVA users wear a strap around their head containing sensors that pick up electrical activity in the brain and relay it, through a series of devices, to software on the Mac. The Mac then displays the signal in real-time 2-D or 3-D graphs. IBVA can be used for biofeedback, and developer Psychic Lab is promoting it as a new art form; other companies are developing brain wave-driven games and adventure software for it.

IBVA includes software and costs \$995 with hardware for one side of the brain or \$1595 with hardware for both sides—or for two people's brains (one side each). Psychic Lab, 212/353-1669.—D.L.

RasterOps Builds Video Wall

For that really big show, RasterOps has come out with The Wall, a system for creating large displays from several 28-inch monitors—as many as 16, stacked 4 high and 4 across. The heart of The Wall is the WallBoard, a NuBus board that can support up to 4 large color monitors. Each WallBoard can accept video input from up to 4 video sources, and the system's included presentation-control software assists with placing those images in windows and



RASTEROPS' WALL CAN HAVE UP TO 16 MONITORS STACKED 4 HIGH AND CONTROLLED BY A MAC.

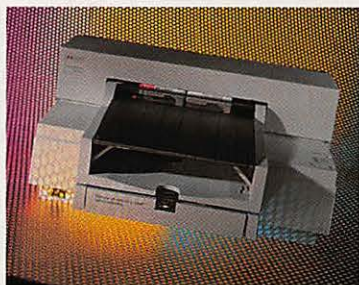
modifying them with special effects. RasterOps also provides presentation templates with The Wall.

Multiple WallBoards work together in the same Mac to support more than 4 monitors.

HP DeskWriter 550C

HEWLETT-PACKARD HAS INTRODUCED the DeskWriter 550C, a color ink-jet printer that contains two ink cartridges to improve print quality and avoid the cartridge-swapping necessary with the single-cartridge DeskWriter C. One of the DeskWriter 550C's cartridges contains only black ink, while the other cartridge holds cyan, magenta, and yellow inks. When printing a color image, the DeskWriter 550C produces sharper blacks than those made by combining the cyan, magenta, and yellow inks to create process black. The printer finishes a full-color page in about 4 to 7 minutes, according to HP.

The QuickDraw printer also has 35 scalable fonts (versus 13 for the DeskWriter C), and it adds an adjustable paper tray and envelope-feeding capability. HP expected to ship the DeskWriter 550C beginning November 1 at a list price of \$1099. The company recently dropped the list price of the DeskWriter C from \$1095 to \$779. HP, 800/752-0900.—T.M.



THE HP DESKWRITER 550C CAN PRINT BLACK-ONLY DOCUMENTS OR FOUR-COLOR IMAGES.

A WallBoard displays graphics at 16 bits per pixel and 1162 by 864 per board (not per monitor). The Wall system was scheduled to be available in October. The list price varies widely according to the number of monitors supported, but was expected to begin at \$4995 for a minimum system not including the monitors. It's meant for conventions, but, hey, what a great game peripheral. RasterOps, 408/562-4200.—T.M.

Pastel's New Colors

PASTEL Development Corporation is upgrading its personal information manager DayMaker with several major changes. Version 2.0's new To-Do view replaces the List view with a split window that separates completed and uncompleted events; reminders can be set to forward themselves if not completed. DayMaker 2.0 provides a very

SONY ENHANCED DATA GRADE D8. DESIGNED TO SAVE YOUR BUSINESS. NOT YOUR BIRTHDAYS.



The more information your business generates, the more you stand to lose. Because not all the 8mm tapes used by business are designed for business.

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This compact D8 cartridge starts out where our video grade leaves off, holding up to 5 gigabytes, for today's high-capacity storage and archiving. With data security features you'd only expect from the inventor of the 8mm video format.

For instance, new D8 has a more durable media for greater data integrity, taking over 1,500 full back-ups, to keep your business moving forward.

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Sony Enhanced Data Grade D8. A memory worth celebrating.

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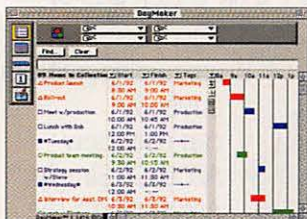


Circle 282 on reader service card

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flexible recurring-event feature that supports moving, changing, or deleting one instance or all instances of an event.

Pastel has licensed printing technology from Portfolio Systems to improve printing capabilities. DayMaker 2.0 was built by Pastel with an open architecture, which the company is using to develop multiuser group-scheduling capability and a structured-field address book for this fall; Pastel expects third-party add-ons to follow. DayMaker 2.0 is \$129. Pastel, 212/941-7500.—D.L.



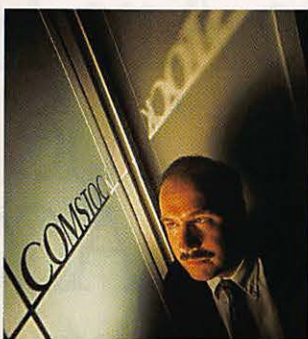
MOST OF THE CHANGES IN DAYMAKER 2.0 ARE NOT VISIBLE—SUCH AS ITS SUPPORT FOR ADD-ON MODULES.

QMS 32-ppm Printer

For those who are tired of waiting at the printer as pages slowly crawl out, QMS has designed the QMS-PS 3200 Print System, a high-speed network laser printer. The QMS-PS 3200 produces up to 32 pages a minute at 300 by 300 dpi. It can accept files in PostScript or PCL (from DOS machines). The printer has LocalTalk, serial, and parallel interfaces included, all of which can accept data at the same time. The user can opt for a fourth interface, either Ethernet or Token Ring.

The QMS-PS 3200 can print on letter- or legal-size paper on one side or both sides. It can contain an optional 40MB or 120MB hard drive and has a SCSI controller for supporting up to six external drives. Other standard features include 45 Adobe Type 1 typefaces, 16MB of RAM, and a high-speed RISC processor that runs QMS Crown, software for controlling print jobs.

The QMS-PS 3200 Print System lists for \$19,995. It is currently shipping. QMS, 205/633-4300.—T.M.



AT COMSTOCK, MILTON RODRIGUEZ USES DEBABELIZER TO AUTOMATE PUBLISHING DIGITAL PHOTO CATALOGS.

Artists'

Rosetta Stone

Equilibrium is shipping DeBabelizer, a graphics-manipulation package that automates preparation of digital images for many uses.

DeBabelizer provides more than 40 graphics formats, for users to open and convert files. It can compare the color palettes from several images and pick the best palette for the group, replacing the least-needed colors with colors from the combined palette. DeBabelizer performs such transformations as converting a Mac image's aspect ratio to one for DOS; and the program can run through a folder of images and paste a credit, copyright symbol, or other text at a specified location on each one. DeBabelizer can record a user's actions as a macro and has a scripting mode. It lists for \$299. Equilibrium, 415/332-4343.—D.L.



THE 32-PPM QMS-PS 3200 PRINT SYSTEM CAN ACCEPT DATA FROM THREE SOURCES AT ONCE.

ACIUS's New Dimension

ACIUS IS DEVELOPING a new version of its database-development environment that, the company says, provides its own preemptive multitasking support, a key database requirement lacking in the Macintosh Operating System. 4th Dimension 3.0 is also modeless and can open windows for coding and running a database simultaneously. Multiuser 4D is obsolete; in its place, version 3.0 will work with the new 4D Server.

ACIUS is developing an interface to allow other applications, such as Excel, to communicate directly with 4D Server databases; ACIUS will also do an interface for Windows. 4D 3.0 will list for \$895; 4D Server pricing will depend on the number of users. ACIUS, 408/252-4444.—D.L.

Fiber Optics for the Desktop

The Retriever Plus from Augment Systems is a fiber-optic network intended for fast file transfers for desktop color prepress. Files are transmitted at more than 1MB per second when using fast Macs such as the IIfx or a Quadra.

The basic Retriever Plus comes with two fiber-optic NuBus boards and a 25-foot fiber-optic cable for linking two systems. Its list price is \$4800 and it is currently shipping. Augment is also shipping a piggyback version that plugs into RasterOps' ProColor 32, a 32-bit color graphics adapter that saves a NuBus slot. Augment Systems, 617/271-0230.—T.M.

For Local Area Viruses

MICROCOM IS UPDATING VIREX to make it network-smart. Version 4.0 comes in two flavors, one for users working alone or on a network, and one for network administrators. The administration module allows a network administrator to configure users' machines without going desk to desk; manage passwords and setup; request users to run a virus scan or force a scan to happen; and receive reports of possible virus activity anywhere on an internet.

Virex lists for \$99.95 per user. The administration module will be included in ten-packs or available free on request. Microcom's Utility Products Group is at 919/490-1277.—D.L.

News



TREND

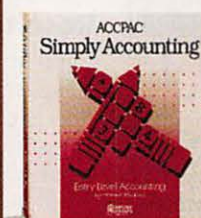
Adobe PixelBurst Processor

The PixelBurst processor, a chip designed by Adobe, can accelerate the rasterizing of images in PostScript by about 10 times. The chip, an ASIC (application-specific integrated circuit), takes the display list (the list of objects that describe the page) generated by PostScript and turns it into a finished bitmap. The bitmap is a representation of which potential dots on the page will be marked (by the printer's toner) and which will remain white.

Previously the rasterization was done by software, but a chip specifically designed for a task like this can always do it much faster than a program. The PixelBurst processor chip will be sold by Adobe to printer manufacturers, who will include the device in their printer controllers, probably before the end of 1992.—T.M.

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Circle 82 on reader service card

DayStar's 68040 TurboStar

The TurboStar from DayStar Digital is a 33MHz, 68040-based accelerator board that speeds up the Mac II, the IIfx, the IIfx, or the IIfx. TurboStar fits in the Macintosh's Processor Direct Slot, which makes it faster than accelerators that connect to the system board through the relative bottleneck of the NuBus.

The list price of the TurboStar will be \$1999 when it ships in late 1992. DayStar will offer inexpensive upgrades to the TurboStar from its existing 50MHz 68030 PowerCache accelerators. The company is also working on a TurboStar for the Mac IIsi. DayStar, 404/967-2077.—T.M.



ROBERT PERRY

THE DGR 256REM FROM DGR TECHNOLOGIES STORES UP TO 256MB ON ITS 3½-INCH OPTICAL MEDIA.

Higher-Capacity Optical Drive

DGR TECHNOLOGIES has introduced the DGR 256REM, a 3½-inch erasable optical drive that stores 256MB, twice the capacity of most existing 3½-inch opticals. Based on a mechanism made by Mass Optical Storage Technologies (MOST), the drive can read from and write to standard 128MB cartridges.

The optical device has an average access time of about 48ms and a maximum data-transfer rate of 1228K per second, according to DGR. The 256REM lists for \$1699 and is now shipping.

DGR also began shipping the DGR 128Turbo, a 128MB,

Scitor Updates Project Manager

KEEPING UP WITH ANNOUNCEMENTS for Microsoft Project 3.0 (Macworld News, September 1992) and Claris's MacProject Pro (News, October 1992), Scitor Corporation is upgrading its Project Scheduler from PS4 to PS5.

PS5 can link dependencies across projects, so that organizations can coordinate an unlimited number of projects that depend on each other's tasks and share the same resources. PS5 has a new Hammock task constraint, with duration based on latest predecessor and earliest successor. PS5's report generator is more flexible than PS4's and supports batch reporting. Resources and tasks can be assigned priorities when performing automatic resource-leveling.

Major changes in the Gantt chart view include support for annotating the chart and the ability to align resource histograms and cost graphs with the chart's time scale. Resources and tasks can be edited or sorted in a table view, and they can be displayed in a hierarchical tree chart view. PS5's price remains \$695. Scitor, 415/570-7700.—D.L.



BETA WAIT

Long-awaited products

ACIUS's 4D Server

Shown publicly January 1991. Current ship date projected: after just-announced 4D 3.0 ships.

FoxPro/Mac

Fox Software discussed publicly winter 1990/91. Microsoft acquired Fox earlier this year, and says it will ship FoxPro/Mac "when it's ready."

Interleaf 5

Discussed publicly October 1990. No ship date projected.

Claris's MacWrite Pro

Announced spring 1991. Current ship date projected: end of 1992.

3½-inch optical drive with an average access time of about 43ms and a data-transfer rate of 768K, the company said. The 128Turbo lists for \$1299. DGR, 512/476-9855.—T.M.



ACEY HARPER

DANIELLE PORTER AND RON CARUANA USE PS5 TO COORDINATE PRODUCT INTRODUCTIONS FOR SEVERAL GROUPS AT GTE.

Travelers' Geography

Strategic Mapping has a new product for travelers, an under-\$100 program tentatively codenamed PinPoint (the final name was not set at press time). With \$25 data packs for many of the world's major cities, business travelers and vacationers can call up a map of, for example, France, zoom in on Paris, and locate all the Federal Express offices or vegetarian restaurants near Notre Dame. PinPoint displays a scrolling text window next to the map with information such as the FedEx offices' hours and telephone numbers, or current reviews of restaurants. (Strategic says PinPoint data is updated monthly and is supplied by the same company that provides information to American Express and the Sabre reservation system used by many travel agents.) Strategic Mapping, 408/970-9600.—D.L.



THE WINDY CITY. ON THE RIGHT IS A LIST OF CHICAGO JAZZ CLUBS THAT COMES WITH A PINPOINT DATA FILE.

News

TREND

InfoTAC Personal Communicator

For all you PowerBook-freedom junkies, Motorola's Mobile Data Division has devised the InfoTAC, a small wireless data communicator that can act as a two-way pager, or as a modem when attached to a personal computer. The InfoTAC radio packet modem weighs about 1.1 pounds and sends data at 4800 bps, or at 19.2 Kbps under Motorola's proposed RDLAP standard. It can use the ARDIS, Bell/ARDIS, Hutchison Mobile Data, MODACOM, and



MOTOROLA'S INFOTAC IS A RADIO PACKET MODEM THAT CAN ATTACH TO A MACINTOSH.

RAM Mobile Data public radio data networks.

InfoTAC has a small backlit liquid-crystal display (LCD) screen for displaying messages. The battery-operated device comes with an AC adapter, an external battery charger, and an RS-232C cable for hooking up to a personal computer.

InfoTAC will list for \$1350 when it becomes available in late 1992. So now you can get your E-mail most anywhere, even in the middle of the night. Motorola, 800/247-2346.—T.M.

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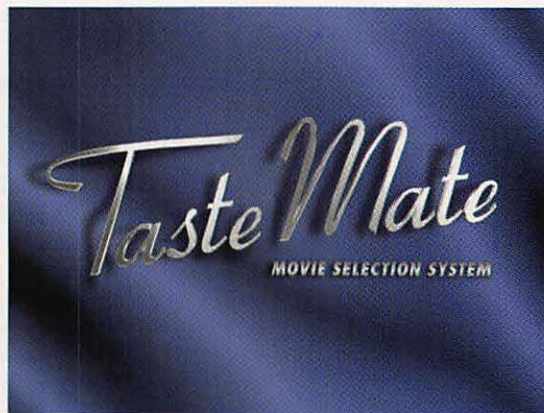
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YOUR MAC KEY-

ROLL-OVERS ON



SONGLETS INTO THE

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TO THE KEYS ON

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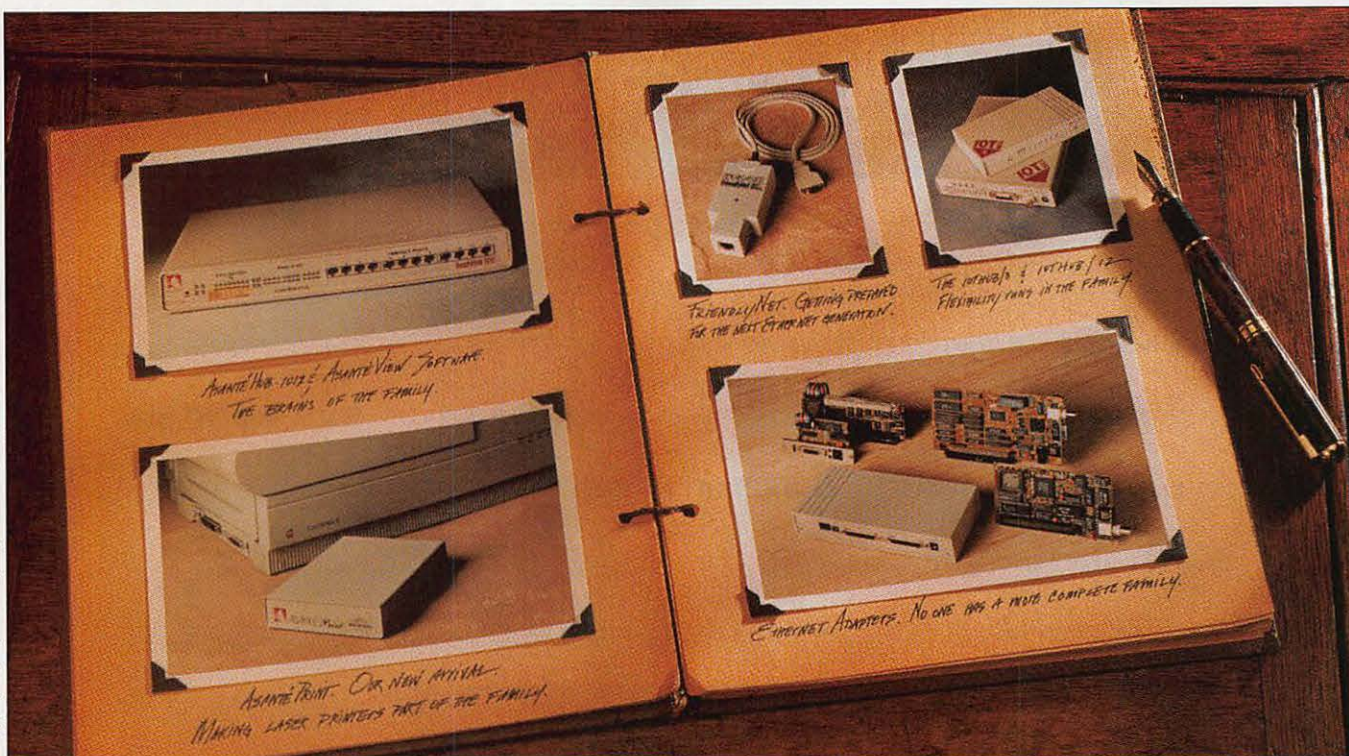
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Source: International Data Corporation, June 1992

Asanté products are available from Ingram Micro, Merisel and Tech Data.

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Money News

WealthBuilder is being upgraded to version 2.0. WealthBuilder is designed to guide users through setting up investment goals and acting on them. Version 2.0's biggest change is integration with Reality Technologies' online databases of securities information. WealthBuilder guides you through setting up your goals and deciding how you want to allocate your assets before you go online to research securities.

WealthBuilder lists for \$169.95 with one month of online time. After the first month,



online access is \$9.95 per month for portfolio updating and stock, bond, and mutual fund quotes; \$17.95 per month buys the above plus access to historical data with risk ratings, performance ratings, and so on (CD and money-market information is not yet available for the Mac). WealthBuilder users can get explanations of financial strategies (but not specific recommendations) for \$9.50 per call, or \$4.95 per E-mail message. Reality Technologies, 215/387-6055.—D.L.

TREND

Mainstay Stays the Course

Though we're still awaiting the paperless office, Mainstay is upgrading MarkUp and Marco Polo—two products that bring paper-free living a step closer.

MarkUp is an on-screen, multiuser document-editing tool. Version 2.0 can merge layers, allowing, say, an editor to work at home and later add that work to the main document on a server. MarkUp supports voice notes and QuickTime and can incorporate a run-time into documents so they run without MarkUp installed. It lists for \$195.



MARKING UP A GROUP DOCUMENT WITH MARKUP 2.0. EACH PERSON CAN ADD TEXT OR COMMENTS TO A SEPARATE LAYER.

Marco Polo is a database for archiving and searching the images and text in digital documents. Version 2.0 supports scanning of paper documents; archives voice and QuickTime data; and provides seven fields for adding keywords to files, each of which can contain 20 pre-defined terms. The price was not set at press time. Mainstay, 818/991-6540.—D.L.

Up-to-Date Again

Now Software is developing version 2.0 of Now Up-to-Date. Version 1.0's confusing metaphor of creating a different calendar for each type of event gives way to a more standard way of categorizing different events and filtering for the ones you want to see. Other new features include the ability to reconcile shared calendars after people who are temporarily disconnected from the network have changed their schedules; a to-do list with scheduled and unscheduled items; replacement of the Reminder Control Panel with Now Utilities' AlarmsClock; and much-improved printing features. Now Up-to-Date 2.0 lists for \$99 for one user; multiuser packs are less per user. Now Software, 503/274-2800.—D.L.



VIRUS WATCH

CURRENT VIRUSES, TROJAN HORSES, AND WORMS

T4-A, T4-B

TYPE: Virus
FIRST LISTED IN VIRUS WATCH: 10/92
INFO: Initially discovered in a game called GoMoku
IMPACT: Both versions of T4 damage system files and applications

ChinaTalk

TYPE: Trojan Horse
FIRST LISTED IN VIRUS WATCH: 10/92
INFO: ChinaTalk is an INIT that comes with a read-me file that claims it provides a female voice for MacinTalk
IMPACT: Deletes the contents of disk drive on restart

INIT 1984

TYPE: Virus
FIRST LISTED IN VIRUS WATCH: 8/92
INFO: Infects INITs; becomes active only on Friday the 13th
IMPACT: Destroys files and changes file and folder names and attributes to random garbage

Code 252

TYPE: Virus
FIRST LISTED IN VIRUS WATCH: 8/92
INFO: Displays a message telling user it is destroying contents of hard drive
IMPACT: After displaying message, it deletes itself without causing damage; infected Macs may behave erratically

News

Boom or Bust

THE SUPERSONIC CONCORDE flies over the ocean, staying away from land as much as possible to avoid shattering people's nerves with its sonic booms. Now NASA-funded scientists at the Georgia Institute of Technology are using Macs to study sonic booms.

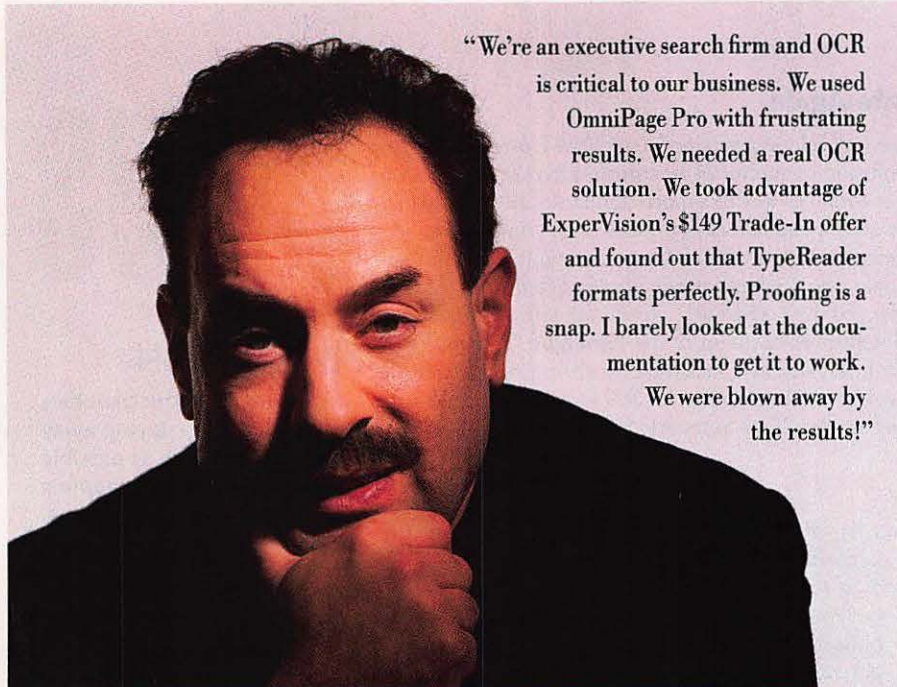
The scientists wrote custom Macintosh software that simulates sonic booms and analyzes their frequencies using an off-the-shelf digital signal processing board. After drawing booms with a mouse or entering them as mathematical formulas, the researchers send the booms to a wall of monster speakers that are several hundred times more powerful than average living-room speakers. Volunteers at-



KRISHAN AHUJA (FRONT) AND CLARK STEVENS WITH A WALL OF MONSTER SPEAKERS THAT SIMULATE SONIC BOOMS.

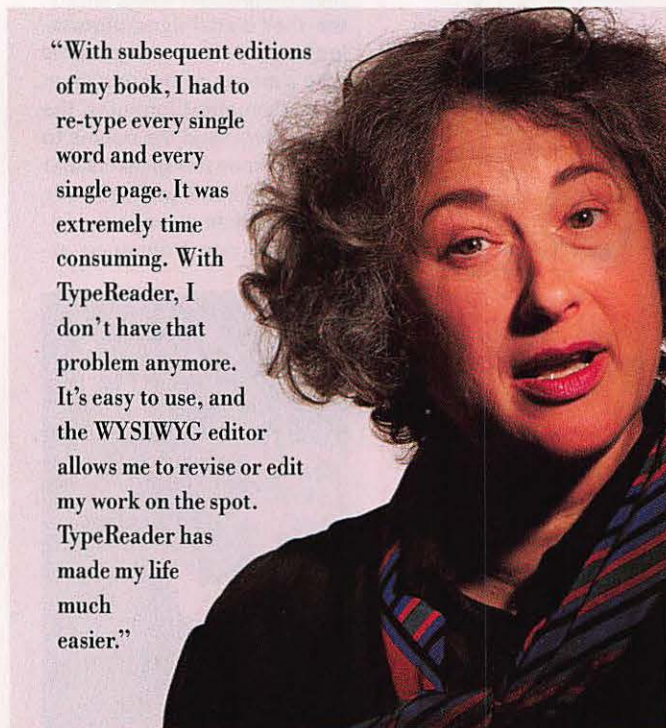
tempt to read or otherwise survive amid a range of sonic booms, then report on which booms were the most tormenting. The researchers are trying to figure out which booms are more tolerable, and why, and hope eventually to influence supersonic aircraft design.

—ANN GARRISON



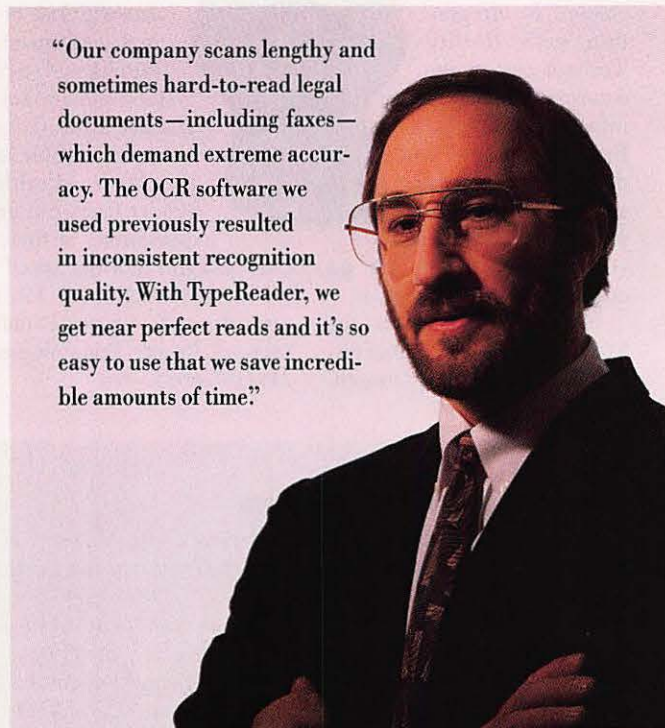
"We're an executive search firm and OCR is critical to our business. We used OmniPage Pro with frustrating results. We needed a real OCR solution. We took advantage of ExperVision's \$149 Trade-In offer and found out that TypeReader formats perfectly. Proofing is a snap. I barely looked at the documentation to get it to work. We were blown away by the results!"

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You can't afford not to compare TypeReader.

FINANCIAL REPORT

Continued from page 1

Projections indicate strong economic growth

Interest rates may continue to fall, but there's growing belief in the bond market that it may not go on much longer.

Many money managers are looking for another rise in short-term rates after the next meeting of the Federal Open Market Committee, the policy-making arm of the Federal Reserve. With confidence in the European currency markets, the additional worry that the American presidential race, and fears about possible attempts to stimulate the economy with tax cuts and increased government spending, few experts expect any substantial decline in rates, at least through the end of the year.

A number of financial experts believe that the political uncertainties could push rates up, while the economic realities will hold rates down. Any major drop in bond yields won't happen for the next few months. The range may be 1.25% to 1.5% for the 30-year bond.

Like a growing number of other money managers, technical market entry may not be on the horizon, but it is showing signs of decline.

Many bond investors believe that the Fed has little room for further rate cuts. One concern is that, before the presidential election and perhaps sooner, Bush will raise rates to very high levels, especially if certain European countries continue to keep their interest rates relatively high.

Lower interest rates predicted

Fewer value managers are being forced to hold and trade based on returns evaluations.

Bargains among closed-end funds have become even more scarce over the past three months, as fund prices have moved higher relative to their underlying pre-share portfolio value. Closed-end funds have a fixed number of shares outstanding, which makes the stock exchange a fund's shares can sell above or below the value of the fund's underlying portfolio value. A fund that sells above its portfolio value is said to be at a "premium," while one selling below is at a discount.

Leading Indicators by Region

Region	Total	Change	Expected
Northwest	268.8	+6.25%	+1.65%
West	232.0	+3.48%	+2.50%
South	186.8	-2.39%	-1.18%
Northwest	145.2	-3.74%	-2.75%
Southwest	190.6	-3.39%	-2.85%

Economic picture a mix of ups and downs

The current U.S. economy, like it has in a still state, is turbulent. As a result, there is a wide movement in the economy one way or the other.

With a month to go before the presidential election, the most recent indicators point to a pessimistic view of the U.S. economy and a contraction in the manufacturing sector. U.S. employment rose 17,000 jobs last month after losing 128,000 the month before, according to the Labor Department. Even discounting the loss of 97,000 jobs resulting from the end of the federal summer job program, employment rose only 40,000 last month to 108.4 million. The unemployment rate fell slightly to 7.5% of the work force from 7.6% in August, but analysts didn't see this as a positive sign.

Meanwhile, the latest disappointing sign from the nation's manufacturing facilities, the Commerce Department said Friday that new orders for heavy goods fell 1.9% in August, the third decline in the past four months.

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ROSEMARY WILTON

NEW MEMBERS OF QUANTUM'S PRODRIVE SERIES RANGE IN CAPACITY FROM 525MB TO 1.2GB, WITH ACCESS TIMES OF 10MS.

Hard Drives with Clout

Drive-industry leader Quantum Corporation has unveiled three more high-capacity 3.5-inch hard drives in its ProDrive series: the ProDrive 1225, ProDrive 700, and ProDrive LPS 525, which store 1.225GB, 700MB, and 525MB, respectively. The new drives have effective average access times of 10ms and can transfer up to 10MB per second when using a Fast SCSI board, according to Quantum. They are also all compatible with SCSI-2 boards.

The new drives should appear in products from other vendors before the end of the year. Prices should range from approximately \$1145 for the ProDrive LPS 525 to approximately \$1795 for the ProDrive 1225.—T.M.

Mac as Camera?

Spectator is a utility for recording what takes place on the Macintosh screen as a QuickTime movie and then editing the bits and pieces into demonstrations and tutorials, especially useful for Mac software training. Spectator clips can be combined with other QuickTime movies; still frames can be inserted between QuickTime movies; and titles can be superimposed on specific frames or series of frames. Spectator also provides 16 tracks of audio for recording and syncing spoken narration with a clip, or importing music and other sound

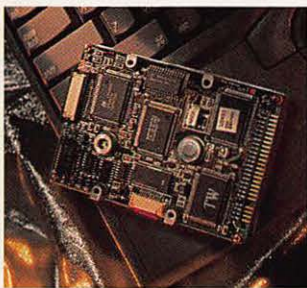
files. You can incorporate a run-time version of Spectator into Spectator files; even users who don't have Spectator can run these files. It lists for \$149.95 from Baseline Publishing, 901/682-9676.—D.L.



CREATING AN ON-SCREEN AD WITH SPECTATOR BY SPLICING A QUICKTIME MOVIE INTO A SERIES OF SCREEN CAPTURES.

PLI 120MB Drive for PowerBooks

FOR POWERBOOK USERS WHO WANT MORE internal storage, Peripheral Land Inc. (PLI) has introduced the PLI 120MB 2.5" Turbo, a 120MB internal hard drive for the PowerBook 140 or 170. The drive sports a 25ms average access time, a sustained data-transfer rate of 1.8MB per second, and a 32K buffer for high performance, according to the company.



PERIPHERAL LAND'S PLI 120MB 2.5" TURBO FITS INSIDE A POWERBOOK 140 OR POWERBOOK 170.

ROBERT PERRY

The tiny hard drive weighs only about 4.8 ounces. Available now, it carries a suggested retail price of \$999. PLI, 510/657-2211.—T.M.

SCSI-2 Board for Radius Rocket

Radius has announced the SCSI-2 Booster, a piggyback board that improves the speed of data transfers on the Radius Rocket, the company's 68040-based accelerator for NuBus Macs. Intended for use with high-speed SCSI peripheral devices, the SCSI-2 Booster incorporates a 40MHz controller chip that lifts the data-transfer rate as high as 7MB per second in burst mode or 4.5MB sustained, more than four times the rate of the NuBus built into a Mac II, according to Radius.

The Rocket accelerator is designed so that multiple Rockets can operate in a single Mac, or, using RocketShare software, be accessed by multiple users over a network. The SCSI-2 Booster lists for \$299 and was slated to ship by the end of October. Radius, 408/434-1010.—T.M.

News

TREND

Data Insights

Those who quest for juicy information among the thorny vines of corporate data are having an easier time of it lately, thanks to simplified data-analysis tools like Dimensional Insights' CrossTarget.

CrossTarget comes in three pieces: Data Integrator is an optional tool for extracting and combining data from Mac and non-Mac databases but requires some expertise to set up; Builder automatically indexes and cross-references data; and Diver is for examining the data. Unlike some competing products, CrossTarget can compare and graph any set of variables with any other set. CrossTarget can work with multi-dimensional data (for example, sales by product by region by quarter) and hierarchical data (for example, sales districts that roll up into sales regions). Data Integrator, Builder, and Diver are available for the Mac, Windows, and Unix. Diver is \$750 on the Mac; Builder and Integrator pricing depends on the platform and number of users. Dimensional Insights, 617/229-9111.

—D.L.



PETER HOEY



TURKEY SHOOT

DESIGN FLAWS NOTED

Multiple Keyboard Layouts In System 7 Apple added an undocumented keyboard command for switching between U.S., Dvorak, and international keyboard layouts. Unfortunately, the command, ⌘ -option-spacebar, is the same command Adobe Illustrator and Aldus FreeHand have been using for years to zoom out.

Apple PowerBook Modems Planning to take your PowerBook to Japan? Don't count on sending faxes home. It is possible, but first you have to open up the PowerBook and reset a jumper on the modem—which violates the warranty.

Macworld will send you a Turkey Shoot T-shirt if we shoot your turkey in this column. See *How to Contact Macworld*.



How to Try Before You Buy.

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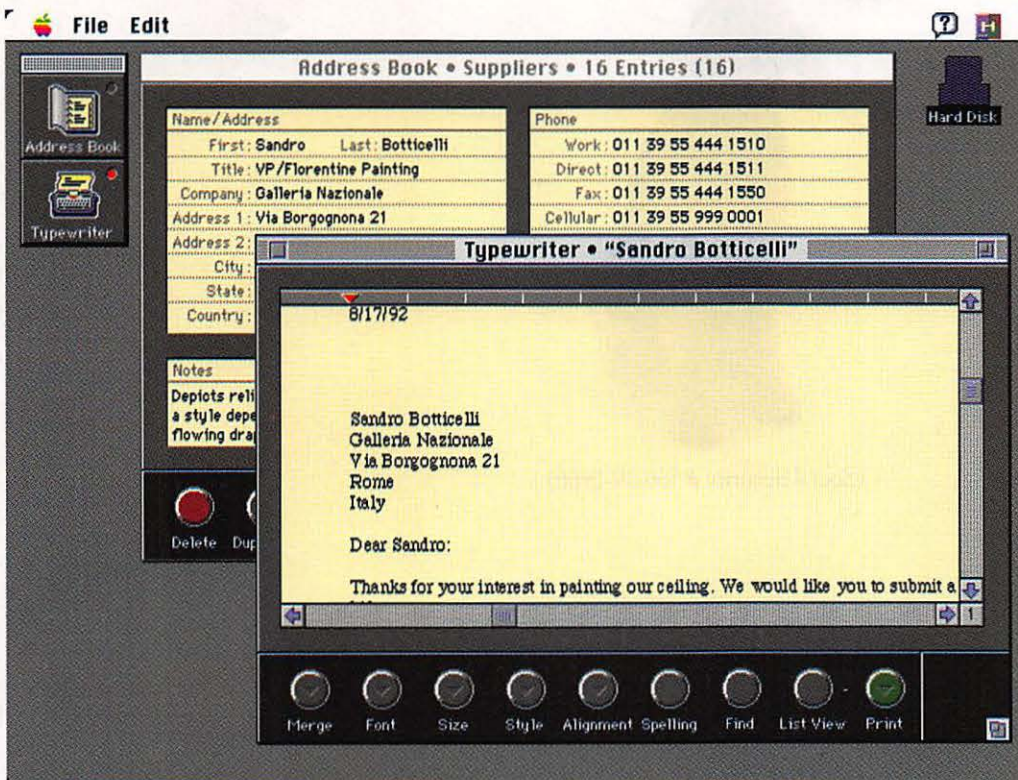
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Starlight's Video Network

Starlight Networks has introduced StarWorks, software that runs on a 486-based DOS machine and supports a digital video network that can include Macs and other computer types. Intended for video production groups, StarWorks supports up to 20 users over NetWare, LAN Manager, NFS, or AppleShare without interfering with the normal operation of the existing network. The Unix-based software is compatible with multiple video standards including Apple's QuickTime, Intel's DVI, and Microsoft's AVI. Using proprietary Streaming RAID (Redundant Array of Inexpensive Disks) software, StarWorks rapidly accesses images stored on multiple drives, according to Starlight.

StarWorks comes in two versions; StarWorks-10 supports data transfers up to 12Mbps per second (or about 10 simultaneous users), and StarWorks-20 supports data transfers as high as 25Mbps per second (about 20 users). For faster image transmission, both versions of StarWorks are compatible with JPEG and MPEG image-compression algorithms. StarWorks-10 lists for \$9950; StarWorks-20 lists for \$18,495. Both are available now. Starlight, 415/967-2774.—T.M.

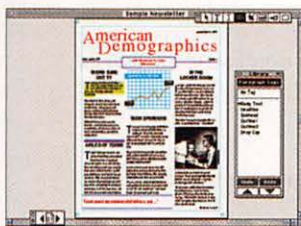
Publish It Easy, Color It Revised

Timeworks is developing Publish It Easy 3.0 and is publishing Color It 2.0.

New features in Publish It include: multiple ruler guides, more drawing tools, paragraph styles for text, access to image-control tools after placing an image (it can import color TIFF images), sizing and positioning of grouped objects, and alignment controls.

Color It is developed by MicroFrontier, which develops and publishes the top-notch gray-scale editor Enhance. Color It 2.0 supports pressure-sensitive tablets, QuickTime compression, and NTSC filtering; provides a virtual-memory scheme that is much faster than System 7's; provides a polygon-selection tool and can lighten, darken, or blend selected areas; has direct scanner support; and works with Photoshop plug-ins.

Publish It Easy 3.0 lists for \$199.95, and Color It 2.0 lists for \$299.95. Timeworks is at 708/559-1300.—D.L.



USING THE NEW PARAGRAPH STYLES CAPABILITY TO FORMAT BODY TEXT IN A PUBLISH IT EASY 3.0 DOCUMENT.

News

3M Projection Panels

3M Visual Systems Division has brought out the 3M Brand Model 5300 and Model 5900 LCD projection panels for PCs and Macs. Both devices measure 10.4 inches diagonally and use active matrix LCDs to display thousands of colors (the Model 5300 shows about 24,000 colors and the Model 5900 shows about 227,000 colors). Both enable users to reveal a screen from top to bottom or left to right, or to blank the screen to prevent distractions during discussion.

The Model 5300 has a suggested list price of \$6795 and should become available in October; the Model 5900 lists for \$8995 and should begin shipping in November. 3M, 800/328-1371.—T.M.

SuperMac's Dye-Sub Printer



THE SUPERMAC PROOFPOSITIVE DYE-SUBLIMATION PRINTER INCLUDES AN EFICOLOR COLOR-MATCHING CONTROLLER.

THE PROOFPOSITIVE, SuperMac's first printer, uses a dye-sublimation engine to produce near-photographic-quality color images with EfiColor color matching. ProofPositive comes in two main versions, the ProofPositive Full-Page Printing System and the ProofPositive Two-Page Printing System. Both produce full-bleed prints at 300 by 300 dpi with continuous-tone color. A typical first single-page print at full bleed takes about ten minutes or less, according to SuperMac.

With a PostScript Level 2 controller and NuBus interface board, the ProofPositive Full-Page Printing System lists for \$9999, and the ProofPositive Two-Page Printing System lists for \$19,499. With a SCSI interface board instead of the NuBus

interface, either printer costs \$500 more. Either interface board takes up a NuBus slot.

The printers do not include any RAM, because they require a host Macintosh. The host Mac, which must have 17MB of RAM, does the processing while still supporting other applications. SuperMac will also sell the ProofPositive Full-Page Printer, which lists for \$6999 without a PostScript controller or either of the interface boards. All the models should be available by January 1993. SuperMac, 408/245-2202.—T.M.

JUST FOR FUN

Star Trek: The Screen Saver

Not content with having After Dark just save the screens of mere terrestrial Macs, Berkeley Systems will take to the stars with Captain Kirk when Star Trek: The Screen Saver boldly goes where no screen saver has gone before. The 15 to 20 user-modifiable modules include



tribbles in the Klingon ship; Spock walking about blasting his phaser; and the Captain and Scotty talking over the intercom. You can also prove yourself a true Trekkie with the Star Fleet Academy Final Exam trivia quiz. Star Trek: The Screen Saver will list for \$59.95. Berkeley Systems, 510/540-5535.—D.L.

The Macintosh Telephone

PHONEPRO ISDN is software for developing Mac-based systems that merge telephones and computers, such as voice mail, fax response, and order entry. PhonePro's iconic programming language provides about 50 functions—for example, answering the line or branching to a subroutine—to string together in a flowchartlike interface, and a simulation environment for testing programs before running them on a real telephone system.

PhonePro is \$450 and requires an Apple ISDN board in the Mac. For \$950 Cypress Research Corporation sells a software-hardware combo for completely analog phone systems. Cypress is also working on run-time software and plans to incorporate voice-synthesis and speech-recognition capabilities when Apple supports those technologies. Cypress, 408/752-2700.—D.L.

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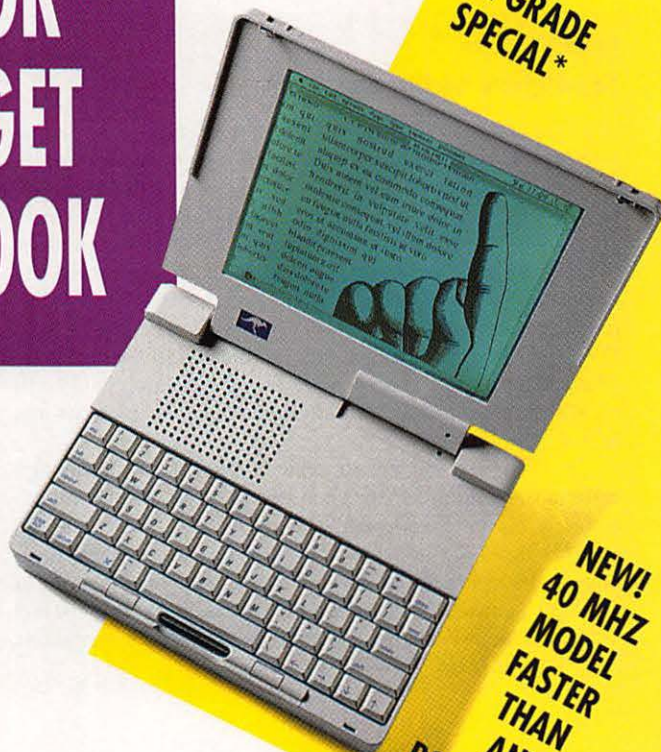
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Circle 23 on reader service card



PAUL BERG

THE LAPIS DUAL PAGE GRAY SCALE DISPLAY IS A 19-INCH MONITOR WITH 1024 BY 848 RESOLUTION.

Lapis Monitors

LAPIS TECHNOLOGIES has come out with the PowerBase I, a SCSI adapter that supports an external large-screen monitor for the PowerBooks, and the Dual Page Gray Scale Display, a 19-inch monitor for Macs. The Power-Base I adapter is compatible with the PowerBook 100, 140, and 170 and with compact Macs that have SCSI ports. The monochrome adapter works with monitors ranging in size from 12 inches to 21 inches and supports resolutions from 640 by 480 up to 1152 by 872. The PowerBase I has a list price of \$599 and is shipping now.

The Dual Page Gray Scale Display shows 256 shades of gray at 1024 by 828 with a refresh rate of 75Hz. Intended for desktop publishing, it shows 74 dpi for true WYSIWYG. The monitor is compatible with the SE/30, the LC and LC II, the Mac II series, and Quadras. It is available at a suggested retail price of \$1049. Lapis, 510/748-1600.—T.M.



New Telecom

Mercury Systems is shipping MacIntercomm. Mercury says MacIntercomm differs from its rivals MicroPhone II and White Knight in several ways: MacIntercomm can transfer files in the background with no impact on performance; its internal virtual-memory scheme can maintain enormous screen buffers; it emulates 4-bit ANSI, the PC standard for color screens; and a smart-dial feature adjusts how MacIntercomm dials numbers based on where you are. MacIntercomm supports many terminal emulations and transfer protocols, including 9K-block Kermit.

Mercury is developing a scripting language for MacIntercomm and plans a run-time engine, as well—but no Mac interface-building tools. It lists for \$199.95. Mercury Systems is at 310/553-0881.—D.L.



BUG REPORT

M.Y.O.B. accounting software M.Y.O.B. sometimes produces rounding errors on sales tax and other operations. This problem may be the result of how the Mac performs floating-point math, which would affect other applications as well. Teleware says it is investigating a fix.

DeltaGraph Professional 2.0 QuickTime movies pasted into DeltaGraph presentations must contain video; audio-only QuickTime disappears when the file is closed. DeltaPoint is not sure when it will fix this bug.

Aldus FreeHand 3.1 Option-double-clicking on grouped objects brings up the Element Info dialog box in preview mode, but in keyline mode it bombs the Mac. Aldus is not sure of the cause.

TouchBase 2.0 Hitting ⌘-F brings up the Find dialog box, but hitting it twice in a row crashes the Mac. This bug is fixed in version 2.01, available free to registered users on request.

MACWORLD WILL SEND YOU A BUG REPORT T-SHIRT IF YOU ARE THE FIRST PERSON TO INFORM US OF A SERIOUS, REPRODUCIBLE BUG THAT WE REPORT IN THIS COLUMN. SEE HOW TO CONTACT MACWORLD.

Three Major Backup Programs Revised

Three backup products are getting major upgrades.

Dantz Development Corporation is upgrading Retrospect to version 2.0 with a simplified interface. Users can test a script before running it on a live backup, and set uninstalled tapes as the destination volume, which is useful for drives that automatically change tapes. Retrospect lists for \$249. Dantz, 510/849-0293.

Fifth Generation Systems' FastBack Plus 3.0 can back up files in Finder-readable format; can delete files based on user-defined criteria; and can keep

historical snapshots of a backed-up volume so that users can restore a drive to any previous state. FastBack Plus's list remains \$189. Fifth Generation, 504/291-7221.

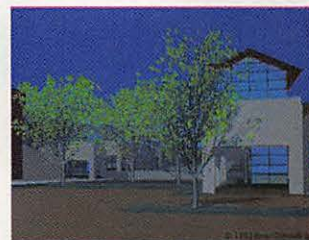
Microseeds Publishing's Redux Deluxe has two major advantages over Redux: the Deluxe version can perform scheduled, unattended backups, and it can archive files, that is, keep files or versions of files after they're deleted from the source volume. Deluxe lists for \$129. Microseeds' products are now marketed by Inline Design, 203/435-4995.—D.L.

News

Instant Trees

ARCHITECTS AND real estate dealers: do your 3-D models look a little stark, your dream homes a bit unlivable? Try adding a soft touch with Tree.

Tree enables you to design trees and save them as PICT files. You can control how tall and thick the trunk is and how many branches and twigs there are, how they're shaped, and how their colors blend together. You can add deciduous-looking leaves (Tree can't generate fir trees) with different densities and coloration to reflect the time of day or season. Parameters can be saved and modified to produce lots of not-quite-identical trees. Tree lists for \$295, and is from Onyx Computing, 617/876-3876.—D.L.



THESE TREES WERE CREATED IN TREE AND COMPOSITED WITH BUILDINGS DRAWN IN AN ARCHITECTURAL MODELER.

TREND

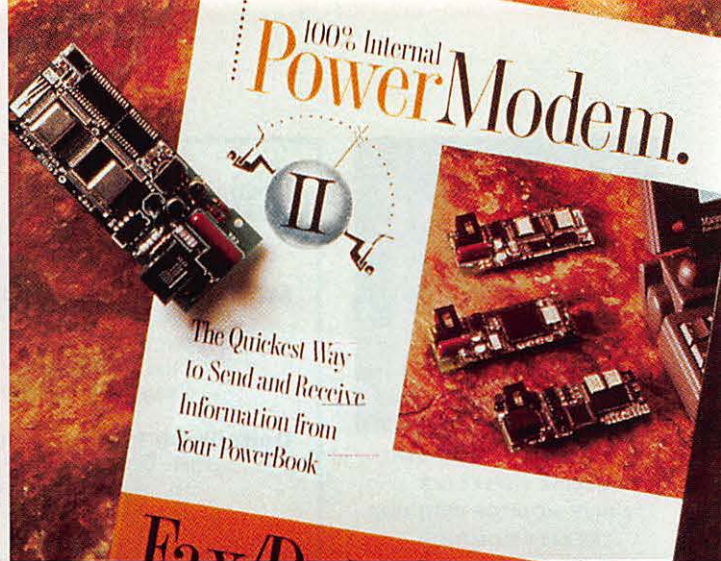
Tapping Institutional Memory

The knowledge of experts in large organizations can be pooled and preserved with Cognitive Systems' ReMind. Unlike conventional expert systems, which use chained-together IF THEN rules, ReMind uses case-based reasoning that requires no programming, deriving reality from historical cases provided by the users. Describe a new case and ReMind seeks the closest matching cases it already knows. Like real experts, ReMind may not find an adequate solution, but each new case refines ReMind's memory; and ReMind has point-and-click editors that let users teach it new relationships and concepts. Case-based reasoning promises to put artificial intelligence technology into the hands of end users without the muss and fuss of programming. ReMind is \$3000 for the development system; \$2000 for optional C libraries; and \$1000 per user run-time. Cognitive Systems, 617/742-7227.—DANIEL W. RASMUS



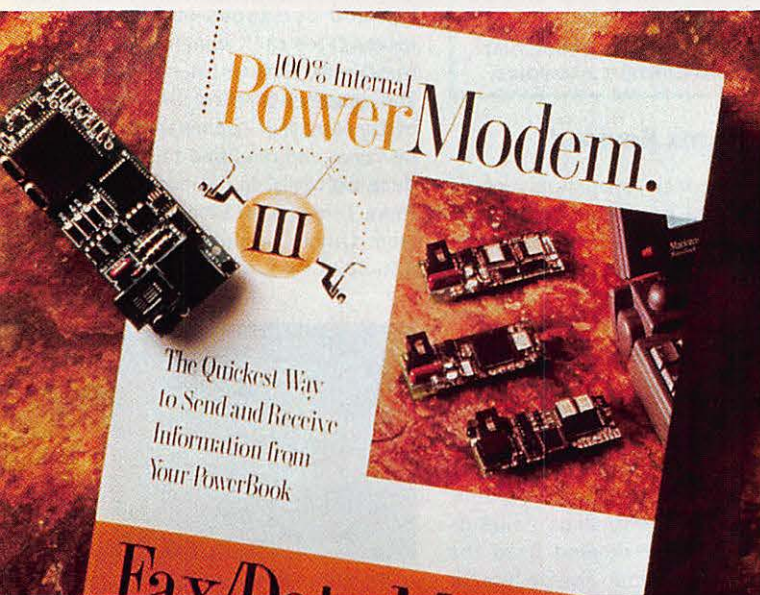
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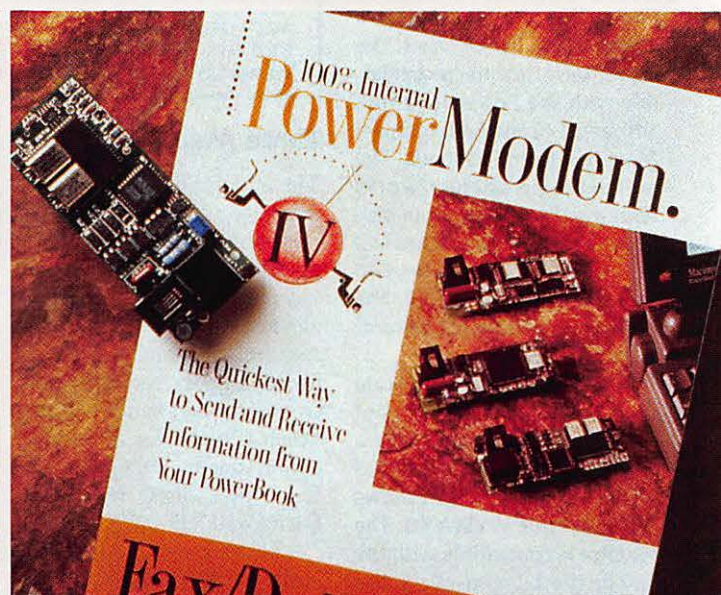
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Survey: Graphics Accelerators

Do you use a graphics accelerator board?

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No
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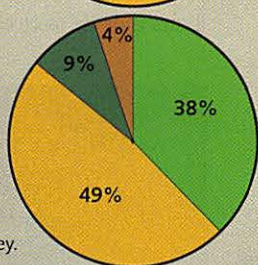
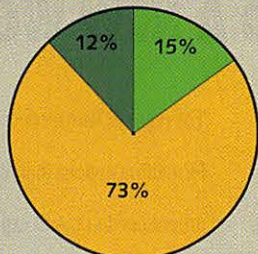
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Not very
Not at all

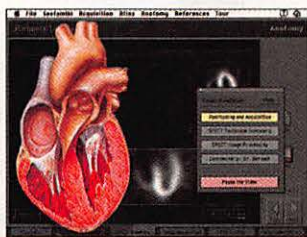
Based on 56 respondents who use DTP software with an accelerator.

Figures are derived from a 1992 Macworld mail-in subscriber News survey.



Imaging the Heart

Though created with expensive workstations, medical diagnostic images can now be displayed on Macs and other desktop computers for study. Yale University's Center for Advanced Instructional Media, in collaboration with the Cedars-Sinai Medical Center of Los Angeles, has just produced a multimedia atlas of nuclear imaging of the heart: The Myocardial Perfusion Imaging Atlas and Videodisc. The Atlas will help physicians, nuclear medicine technicians, and medical students study cases in which nuclear imaging of the heart is



A GROUP AT YALE DEVELOPED THIS TUTORIAL SYSTEM FOR MEDICAL PRACTITIONERS TO STUDY IMAGING TECHNOLOGY.

used to assess blood flow through the coronary arteries and will help them to recognize blockages that may have damaged the muscular walls of the heart. Contact the center c/o Patrick Lynch, Biomedical Communications, 333 Cedar St., New Haven, CT 06510. —ANN GARRISON

Fast PowerBook Fax Modem

THE POWERMODEM IV from PSI Integration is a high-speed fax modem that fits inside Apple's PowerBooks. The board sends and receives both data and faxes at 14,400 bps (compared with 9600 bps for most fax machines and fax modems). The PowerModem IV includes V.23, V.32, V.32bis, V.42, V.42bis, and MNP Class 10 error-correction and compression standards.

The PowerModem IV also supports the Hayes AT command set. Lack of the complete AT command set has caused Apple's Macintosh PowerBook Internal Fax/Data Modem to have problems hanging up the phone line. Available now, the PowerModem IV lists for \$799. PSI, 408/559-8544.—T.M.

External Fax Modems

Global Village's TelePort/Bronze, TelePort/Silver, and TelePort/Gold fax modems are external devices that send and receive data at 2400 bps, 9600 bps, and 14,400 bps, respectively. All three products send and receive faxes at 9600 bps.

Available now, the Bronze lists for \$249. The Silver's list price is \$449, and the Gold's list price is \$649. The Silver and Gold were slated to ship around the end of October. Global Village, 415/390-8200.—T.M.

Taxan Ships

Flat-Square Monitor

Taxan America has begun shipping the MultiVision 875 Plus, a 17-inch flat-square monitor that can show resolutions up to 1280 by 1024 at 70Hz. The multisynch monitor is compatible with Macs and DOS machines. It has a silica-coated screen for glare reduction, and dynamic beam focus to prevent distortion in the corners of the display.

Available now, the MultiVision 875 Plus lists for \$1899. It comes with a BNC cable and adapters for Macs and DOS machines. Taxan America, 408/748-0900.—T.M.



THE MULTIVISION 875 PLUS 17-INCH FLAT-SQUARE MONITOR SHOWS UP TO 1280 BY 1024 PIXELS.

News

New Add-Ons for Microsoft Word

Alki Software is shipping add-ons for Microsoft Word 5.0. MasterWord (\$99.95) adds a user-modifiable tool bar to Word and provides several new features including a print-envelope command, automatic paragraph-bulleted, and a simplified table interface. MasterWord also comes with much-expanded help files and several desk accessories including a calculator and a text-searching tool. Other Alki add-ons include a \$99.95 spelling dictionary, a hyphenation file, and a thesaurus available for 14 European languages; a greatly expanded English-language thesaurus and dictionary are \$79.95 each. Alki Software, 206/286-2600.—D.L.

DESKTOP LIBRARIAN

Books on Shareware

This month we pore over two books that help provide access to large quantities of software.

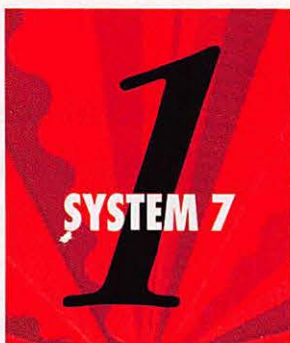
- *The Mac Shareware 500*, by Ruffin Prevost and Rob Terrell (1992, \$39.95). This massive book gives brief reviews of 500 shareware and freeware packages. It thoughtfully starts out with a chapter on how shareware and related concepts work, another on how to access shareware over online services, and a third on how to deal with problem programs. The reviews make up the bulk of the book, however, covering everything from business applications to games. Includes an index and a program index, three disks containing some classic shareware, an America Online membership disk, and a certificate for five free hours of connect time on America Online. Ventana Press, 919/942-0220.

- *The Mac Shareware Emporium*, by Bernard J. David and Maria L. Langer (1992, \$34.95). This even-larger volume offers reviews of more than 450 shareware programs. The first chapter gives an overview of what shareware is and of its pros and cons. The second chapter instructs the reader on how to get shareware. Most of the rest of the book is dedicated to reviews, organized by type of software, that include such information as the size of a program and what hardware and software is necessary to run it. Includes an index, a list of the authors' favorite shareware, and a separate section on shareware sources. Also comes with two disks of shareware. Brady Publishing, 800/428-5331.—T.M.



THE MAC SHAREWARE 500 AND THE MAC SHAREWARE EMPORIUM BOTH INCLUDE—SHAREWARE.

7 REASONS WHY YOU NEED A NEW WORD PROCESSOR.



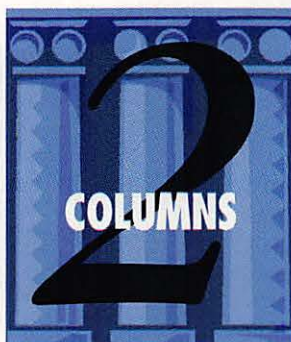
Because you're ready to see what System 7 can do.

Apple calls System 7 the biggest improvement in Macintosh since Macintosh. And WordPerfect® is now System 7 savvy.

So now (among lots of other new things), WordPerfect will automatically keep track of changes that you (or someone else) might make to imported files (charts, graphics, whatever), and update your WP documents accordingly. Now, a change made in one place can be a change made in many places. Apple calls it "Publish and Subscribe," and it works between programs on your hard drive, as well as among people on

your network. Publish and Subscribe assures you that your documents will always reflect the latest information available.

And it's just one of the new System 7 tricks that WordPerfect 2.1 has mastered.

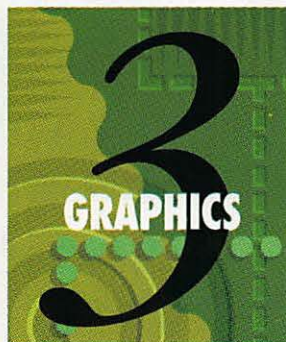


Because WordPerfect does columns better than the Greeks.

Pick a starting point, click on the ruler, and see your text in two columns. Or in three columns. Or five columns. With vertical rules beside or between them, if you like. Drag a guide on the ruler and try *unequal* columns. Highlight text in a box that jumps across columns.

Go crazy with the design, or stick with the tried-and-true.

The point is, WordPerfect gives you formatting options that other word processors don't. And exploring them couldn't be much easier.



Because you'd use more graphics if using them were easy.

WordPerfect not only gives you full control over the placement of graphics in your text, it also gives you a color drawing program for modifying imported artwork (or starting over from scratch) without ever leaving the program.

You can print graphics under your text (as "water-

marks") or on top (as overlays).

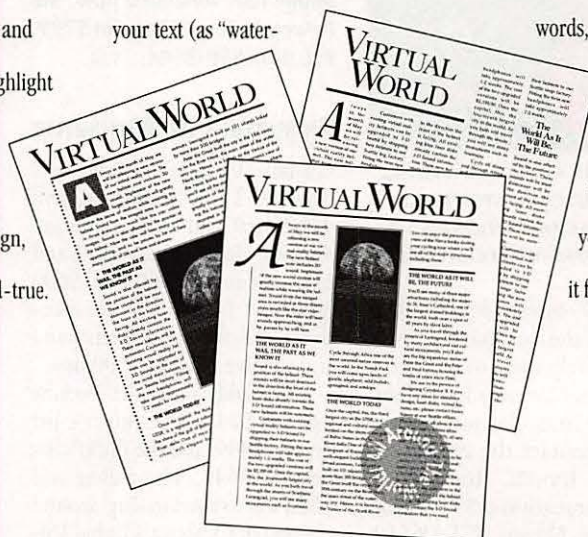
You can use the drawing tools to rotate text to any angle that strikes your fancy (something many page-layout programs still can't do).

And WordPerfect gives you 36 border styles and 64 fill patterns — which you can use in any of 256 colors — for highlighting graphics, paragraphs, columns, pages, even blocks of text.



Because a movie is worth who-knows-how-many words.

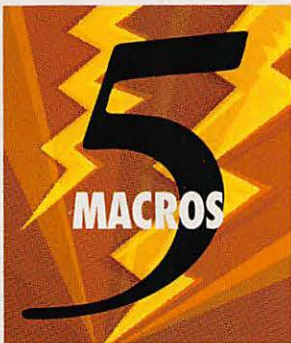
If a picture is worth a thousand words, what's a movie worth? With WordPerfect and QuickTime, you can calculate it for yourself.



Apple's QuickTime is a new technology that lets you work with digital video and sound as easily as you now work with text and graphics files.

Imagine being able to place (and size) a QuickTime movie anywhere in a document. You could add urgency to a memo with a few well-chosen words delivered "live." Or help an audience visualize your latest brainstorm with a 3-D simulation they can start, stop and replay.

We have a feeling that words can't begin to describe all the ways you'll think of to use it.



Because you get tired of repeating yourself, yourself, yourself.

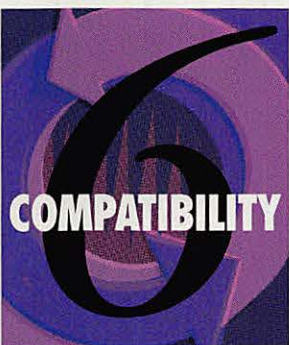
Perhaps because they've heard it's a powerful programming

language, WordPerfect's macro editor intimidates some people at first. It shouldn't.

It's no more complicated than a tape recorder. Click "record" and it memorizes your keystrokes. Click "play" and it repeats them.

With no more knowledge than that, you can create a WordPerfect macro. And can spare yourself the effort of formatting M-E-M-O-R-A-N-D-U-M, T-o-:, F-r-o-m: (and so on) across the top of the page every time you want to fire off a memo, for example.

But simple as recording your own macros can be, we also ship a number of them with the program. For formatting addresses to print on envelopes. Placing "drop caps" at the start of paragraphs. And other jobs you'd rather not do twice.



Because some people work on DOS computers.

You want the word processor that's right for you. If your choice happens also to be the choice of millions of others — with other computers — so much the better.

That's why WordPerfect is such a good choice. Lots of DOS users use WordPerfect. As well as UNIX, VMS and other users. If you ever find your Mac on a network with other computers,

WordPerfect's compatibility can save you a lot of aggravation. Not to mention a lot of reformatting.



Because even if you never call us, it's nice to know we're here.

Like any good Mac program, WordPerfect 2.1 is easy to use. But unlike many Mac programs, you're not on your own with it. You get

toll-free help from one of the largest support staffs in the industry.

For more reasons to try WordPerfect, call for our free video. 1-800-526-7820



WordPerfect®

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The PowerBook Duo system is designed to work on the desktop, when inserted into the Duo Dock (top); as a stand-alone portable (left); and when connected to the Duo MiniDock (right).

Apple's Dynamic Duo

They're laptops. They're desktop Macs. They're both!

Back when the first battery-powered portable personal computer appeared—which was nearly ten years ago—people began predicting the death of the desktop machine. The demise of the desktop computer hasn't happened yet, and for some good reasons:

most people want their desktop machines to have large, detachable keyboards; color monitors; expansion slots; and ports for add-ons like hard drives, scanners, and CD ROM drives. Desktop computers welcome new hardware, but with most portables, if it isn't inside, it doesn't exist.

It is certainly true that Apple's standard PowerBooks—the 145, 160, and 180—are less introverted than most notebook computers, offering ports that can connect to a mouse and keyboard, SCSI devices, and LocalTalk networks. The PowerBook 160 and PowerBook 180 can even run external color monitors. But who wants to disconnect and reconnect several cables and fuss with control panel settings every time you leave or return to the office?

The solution for most portable-computer owners has been to also buy a desktop machine—if their budgets or corporate purchasing policies allow that kind of investment. Buying two machines is great for the computer industry, but it complicates life by forcing you to manage two

hard drives and to copy files between machines. And it's expensive.

It was with these issues in mind that Apple designed the Macintosh PowerBook Duo system. The nomadic half of a Duo system is a 4.2-pound computer, known as the PowerBook Duo, that's even smaller and more mobile than a standard PowerBook. Two PowerBook Duo models are available; both are fast machines with copious hard drives, good-to-very-good displays, no built-in floppy drives, and practically no built-in ports. The PowerBook Duo 210 retails for \$2249; the faster 230 lists for \$2609. (All the prices cited here are preliminary.)

The deskbound half of the Duo system is a \$1079 *docking station* called the Macintosh Duo Dock. The Duo Dock offers space for two NuBus expansion boards, a second hard drive, extra video memory, and the ports that other Macs provide. On its front panel is a large slot into which you insert a closed PowerBook Duo—a task akin to inserting a tape into a videocassette recorder. United, the two form a fast desktop Mac that is more expandable than a Mac IIx.

There is more to the Duo system than just a PowerBook Duo and the Duo Dock. Two smaller docking stations, the Macintosh Duo MiniDock and the Macintosh Duo Floppy Adapter, are designed to add ports without sacrificing portability.

by Jim Heid

There is also an external floppy drive, a selection of adapters and battery chargers, and an optional built-in modem. A variety of third-party portable docking stations are also in development that will provide Ethernet network ports, video-expansion features, and even a cellular phone connection. There will certainly be a strong market for carrying cases—if not backpacks.

Numerous docking stations are available for DOS notebook computers, but none embodies the engineering finesse behind the Duo system. Nonetheless, there are some compromises in the PowerBook Duos and in the Duo Dock docking station. Although Apple describes the Duo system as providing the best of both worlds (the system's development code name was BOB W), some people will still be better served by stand-alone Macs and PowerBooks.

The Petite PowerBooks

A STANDARD POWERBOOK LOOKS portly alongside a PowerBook Duo. A standard PowerBook weighs 6.8 pounds; a PowerBook Duo weighs 4.2. A standard PowerBook is 2.25 inches high, 11.25

inches wide, and 9.3 inches deep; a PowerBook Duo is 1.4 inches high, 10.9 inches wide, and 8.5 inches deep. A Duo is also less angular, with rounded front edges that should make it more comfortable to carry. Rubber bumpers along the sides of the machine help cushion it against bumps.

But there is nothing diminutive about a PowerBook Duo's power. In the PowerBook Duo 210, a 25MHz 68030 presides over 4MB of RAM and an 80MB hard drive. The PowerBook Duo 230 uses a 33MHz 68030 and is available with an 80MB or a 120MB hard drive. Neither model has room for a 68882 math coprocessor chip, but one is available as an option for the Duo Dock.

Each Duo model uses a supertwist, liquid crystal display (LCD) screen capable of showing up to 16 levels of gray, as in the PowerBook 160. The 640-by-400-pixel resolution is identical to that of the standard PowerBooks, but the screens themselves are physically smaller, measuring 9.1 inches diagonally versus 10 inches on a PowerBook 170. A tiny (and tinny-sounding) speaker sits to the left of the display. To the right is a set of brightness and contrast buttons. The top cover, which is also the screen, is remarkably slim—just 10.5 millimeters thick, versus about 19mm on a PowerBook 170.

The Duo displays are not as brilliant

as the active matrix displays used in the PowerBook 170 and 180, although they are brighter than the PowerBook 100 and 140/145 displays. Apple says the main reason it did not use active matrix displays in the Duo models is that they would have required a wider screen lid. *Macworld* writers and editors who previewed the machines had mixed opinions on the display. Some liked it, but others felt that the Duo's gray-scale images looked muddy and said they'd prefer to use the computer in black-and-white mode when possible.

Honey, I Shrunk the Input Devices

APPLE'S ERGONOMICS CLAIMS NOTWITHSTANDING, notebook computers aren't known for being finger friendly. One reason is that they're often used in places where you can't control desk and chair height; another is that their input devices are smaller than those of a desktop machine. The Duo's trackball and keyboard are even smaller than a standard PowerBook's. These are not computers for the ham-handed.

The Duo's marble-size trackball measures just 19mm in diameter; standard PowerBooks have a 31mm trackball. Pointer movement is surprisingly smooth, though, thanks to three tiny synthetic ruby bearings that support the trackball. The trackball's tininess keeps it from protruding above the Duo's palm rest; the



How Fast Are the PowerBook Duos?

Processor Tasks

Four tests indicate processor performance: performing a search and replace in Microsoft Word, previewing and magnifying in Aldus FreeHand, and sorting in Claris FileMaker Pro.

Drive Access Tasks

Two tests represent overall performance for tasks involving intensive access to the hard drive: opening an Adobe Photoshop file and duplicating a 3.2MB file.

Display Tasks

Two scrolling tests—in Microsoft Excel and Word—show processor performance during screen redrawing.

Math Tasks

A test in Excel—consisting of complex arithmetic functions—indicates math coprocessor performance. In computers without a coprocessor, tasks were performed by the main processor.

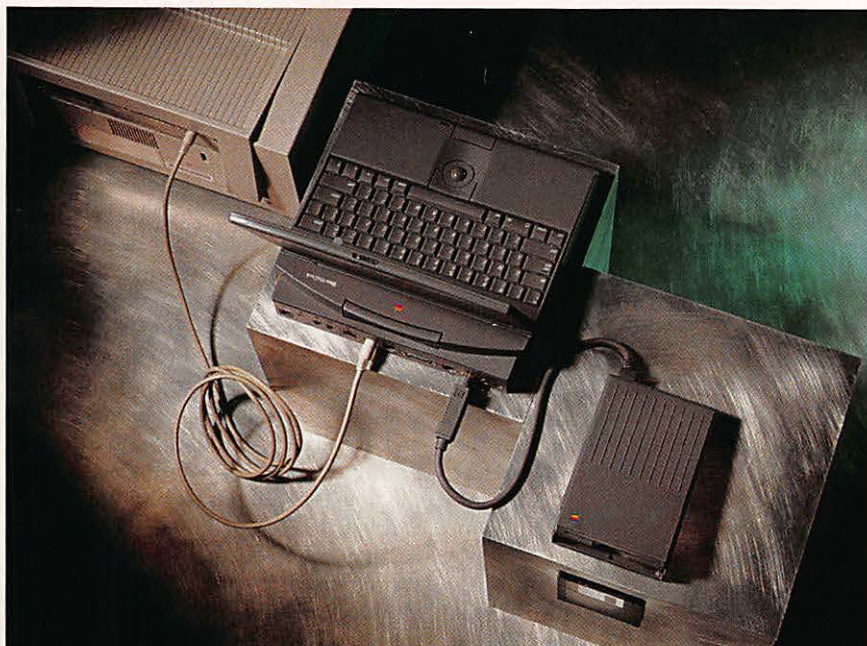
Quadra 950	18.1	21.0	44.2	19.7
PowerBook Duo 230	37.9	34.9	64.4*	198.0
Macintosh IIfx	53.2	36.5	112.7	43.5
PowerBook Duo 210	51.5	42.0	101.8*	265.6

Times are in seconds. Shorter bars are better.

*These results reflect the math coprocessor present in the Duo Dock. When the PowerBook Duos are used separately from the Duo Dock, they do not have a math coprocessor, and the tests took 198 seconds for the Duo 230 and 265.6 seconds for the Duo 210 to complete.

If you're wondering how the PowerBook Duos compare in performance to desktop Macs, the answer is that the 33MHz Duo 230 is a bit faster than a IIfx, while the 25MHz Duo 210 is a bit slower on the series of common

tasks that we tested. The Quadra 950 and Macintosh IIfx (with cache card) were tested with 8MB of RAM, internal video, and System 7.0.1 with Tune-Up. Both Duos were running System 7.1.6 and 4MB of RAM.



Getting Connected The PowerBook Duo 210, center, connects to the outside world via the Duo MiniDock, a small, half-moon-shaped extension board that connects to the back of the Duo. Here, the MiniDock connects to a LaserWriter, left, and an external SuperDrive drive, right.

two trackball buttons are also recessed. This makes the whole affair less obtrusive and allows for a thinner lid, but some people may find it makes pointing and clicking more cumbersome, especially for those with large hands.

The Duo keyboard layout is identical to that of the larger PowerBooks, although the keyboard itself is different. The spacing between keys is slightly tighter, making the keyboard a bit more cramped. Also, the key travel—the distance a key moves down when pressed—is shorter: about 2.5mm versus 3mm. Half a millimeter isn't much, but to me, it makes the keyboard feel a bit more responsive. One small but welcome plus for those with large fingers: a light within the caps lock key illuminates when active.

Above the keyboard is a small power-on key—no need to reach behind the computer, open a door, and grope for the power switch as you had to with the 140 and 170. To the left of the power-on key is a built-in microphone. The PowerBook Duo does not have a sound-input jack.

Opinions varied among *Macworld* editors and writers, but most liked the keyboard and found the recessed trackball particularly appealing. Still, at least two of us hated the trackball (both of us already have sore hands from computer use), showing that tastes in input devices do vary. Try to spend some time with a machine before buying. It's especially important to come to terms with a Duo's input devices, since you can't attach a mouse or keyboard unless you also attach one of the docking stations.

Looking Inside

THE DUO KEYBOARD AND ITS LOGIC board are surrounded by a magnesium frame that adds rigidity to the case and helps align the computer at docking time (see "Interior Strength"). Part of the frame also touches the top of the PowerBook's 68030 processor, where it draws off heat and cools the processor.

Thanks to a new memory design, the PowerBook Duo 210 and 230 can house up to 24MB of RAM, versus the 8MB limit of the PowerBooks 140, 145, and 170, or the 14MB limit of the PowerBooks

160 and 180. The Duo uses 70-nanosecond dynamic RAM (DRAM) chips, not the pseudostatic RAM chips used in a standard PowerBook. As a result, memory expansion boards should be less expensive, and come in a wider range of capacities. Best of all, due to changes in design, you can install such boards yourself without voiding the warranty (Apple still recommends technician installation). Removing three screws from the bottom of the Duo's case lets you remove the keyboard to expose the memory-expansion slot.

A conventional DRAM chip requires separate refresh circuitry that essentially jogs the chip's memory periodically to keep it from losing its contents. The Duos' DRAM chips use a unique self-refreshing technique that eliminates the need for separate refresh circuitry.

Besides a memory-expansion board, there's also room inside a PowerBook Duo for a modem. Apple's optional Macintosh PowerBook Express Modem, which will be available in January, supports 9600-bps V.32 operation and can send and receive faxes. The modem is unique in that it is partially implemented in software—the Duo's 68030 does some of the work that would normally be performed by dedicated chips. This keeps the modem's size down—it measures just 2.38 by 2.25 inches—and will allow Apple to add new communications features by simply releasing new software. On the downside, it means that the Duo's processor must work harder during communications sessions. A PowerBook Duo may be more sluggish than other Macs when you switch to another program while transferring a file or sending or receiving a fax in the background. Another drawback is memory use: when you turn on the modem (using an included control panel), you lose roughly 300K of RAM.

Apple says the lack of real estate inside a PowerBook Duo means that you're not likely to see a large selection of third-party modems for the Duo line. Global Village Communication, however, is working on porting its GlobalFax software to the Duo.

As for system software, the PowerBook Duos require and include System 7.1. Both machines include the new PowerBook control panel, which provides more-straightforward control over power-management features than did the old Portable (see *Lab Notes* in this issue), and the new PowerBook Display control panel, which saves battery power by turning backlighting off after a specified period of inactivity. Also included is the new Auto Remounter control panel, which lets the system automatically remount any shared hard drives that were connected during the previous docking. For example, say you are connected to a file server at the office and then you take the PowerBook Duo on the road. When you return to the office and reconnect to the network, the Auto Remounter control panel automatically remounts the file server—no need to go through the Chooser to reconnect manually.

The Power to Be Powered

INSTEAD OF THE NICKEL-CADMIUM batteries used in the standard PowerBooks, the Duos use a nickel-metal-hydride battery that provides more power in a smaller package and can charge more quickly—in about an hour and a half, versus four to five hours for a PowerBook 170's battery. Nickel-metal-hydride batteries are also considered less toxic to the

environment; cadmium has been classified as a toxic material by the EPA, but to date, metal hydride has not.

Unlike all standard PowerBooks except the 100, a PowerBook Duo's battery bay is on the front edge of the machine, not on the side. This location makes it possible to change and recharge batteries while the PowerBook Duo is in the Duo Dock.

Apple has refined its power-management technology (trademarked as the EverWatch battery saver) to give the Duos some new tricks. You can change the battery when the PowerBook Duo is asleep without plugging in the power adapter; try this on a standard PowerBook, and you shut down the computer, sending any unsaved work into oblivion. Also, when you lower the Duo screen to its closed position, the system automatically goes to sleep.

Unfortunately, Apple did not fix a power-management-related problem that can cause data errors between the computer and musical instruments connected

via MIDI. Because the power-management software periodically interrupts the CPU, errors can occur when you're transferring large amounts of MIDI data (specifically, when you're doing large system-exclusive dumps of data like sound samples—the system should work fine for general sequencing). For all of Apple's interest in multimedia, unfortunately, the company has yet to produce the perfect musician's computer.

Prepare for Docking

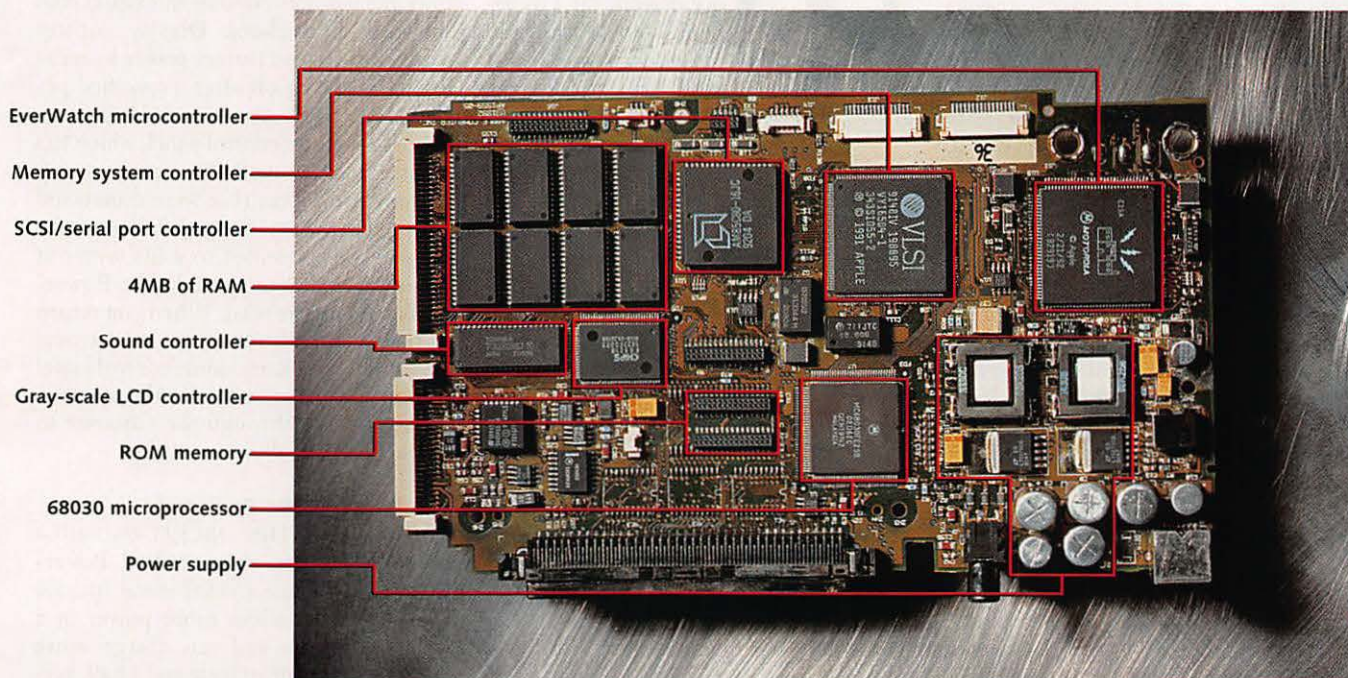
BEFORE DOCKING A POWERBOOK DUO, you must invoke its Shut Down command; if you try to dock a sleeping Duo, the dock ejects it and a dialog box appears on the Duo's screen. (Of course, you have to open the lid to read it.) After shutting down, you open the PowerBook Duo's rear door, exposing a 152-pin, palladium-plated docking expansion connector (see "Comparing Ports"). The docking expansion connector is a 32-bit Processor Direct Slot that allows access to every signal line on the 68030 processor.

After opening the docking expansion door, slide the Duo into the Duo Dock's slot and push gently. As the PowerBook approaches the rear of the slot, two steel alignment pins in the dock meet corre-

sponding holes in the PowerBook's internal magnesium frame, ensuring that the expansion connector will mate accurately with its counterpart in the Duo Dock. When the PowerBook Duo is 5mm away from its destination, it trips an optical sensor, activating two motorized hooks that grab the PowerBook's magnesium frame and draw the computer home with a satisfying thunk. All this happens in about the time it takes to insert a floppy disk in a disk drive.

Is it reliable? Apple says yes, adding that the steel alignment pins and the magnesium frame are manufactured to tight tolerances that ensure the connectors always mate accurately. The Duo Dock's motor mechanism does not require periodic alignment or adjustment, and Apple says the docking expansion connectors are designed to endure 5000 connect/disconnect cycles. It is an impressive piece of engineering.

Once the PowerBook Duo is docked in the Duo Dock, it has two serial ports, an Apple Desktop Bus (ADB) port, a SCSI port, an external monitor port, a larger speaker, and two NuBus slots. The monitor port uses the Duo's video circuitry to display up to 256 colors on monitors as large as 16 inches. The Duo Dock con-



The Duo's Logic Board The Duo's logic board displays a high degree of integration, packing a lot of circuitry into a compact space. Custom-designed chips from Apple such as the EverWatch microcontroller, which manages the power-saving capabilities of the Duo, provide many of the sophisticated features that make the whole Duo system possible.

How the Duo System Fits Together



Duo Dock

Provides 16-bit color video support, two internal NuBus slots, a bay for an internal 3.5-inch SCSI hard drive, an internal 1.4MB Apple SuperDrive, as well as connections for SCSI, an ADB port, a video port, two serial ports, and sound-in and sound-out ports.

HDI-20 External 1.4MB Floppy Disk Drive

This floppy port plugs directly into the Duo Floppy Adapter or the Duo MiniDock.

HDI-30 SCSI System Cable

SCSI cable for connection to SCSI peripherals.

HDI-30 SCSI Disk Adapter

Allows you to connect a Duo as an external hard drive on another Macintosh system.

Duo Floppy Adapter

Allows you to connect the external HDI-20 floppy disk drive to the Duo and includes an ADB port for a mouse and a security slot for securing the Duo to your desk.

Duo MiniDock

Provides 8-bit color video support, as well as an ADB port, two serial ports, connections for SCSI and floppy drives, and sound-in and sound-out ports.

PowerBook Duo 210

Apple's lightest and slimmest PowerBook weighs 4.2 pounds, and measures 10.9 by 8.5 inches. The Duo is designed to provide a wide range of configurations for those who want both portability and expandability.

Battery Cover

You can open this door and remove the battery without first ejecting the Duo from the Duo Dock.

PowerBook Duo Rechargeable Battery

This nickel-metal-hydrate battery provides up to 4.5 hours of usage and can be charged in about 2 hours.

Duo AC Adapter

Powers the Duo. Allows you to recharge the battery without removing it.

PowerBook Duo Battery Recharger

You can attach this recharger to the AC adapter and charge an extra battery while you use the Duo.

Four Duo Configurations*

MAXIMUM PORTABILITY



PowerBook Duo 210 4/80	\$2249
A/C adapter	\$65
extra battery	\$69
battery recharger	\$119
Total	\$2502

PORTABILITY AND COMFORT



PowerBook Duo 210 4/80	\$2249
floppy adapter	\$135
floppy disk drive	\$199
mouse	\$99
A/C adapter	\$65
extra battery	\$69
battery recharger	\$119
Total	\$2935

ENTRY-LEVEL DESKTOP



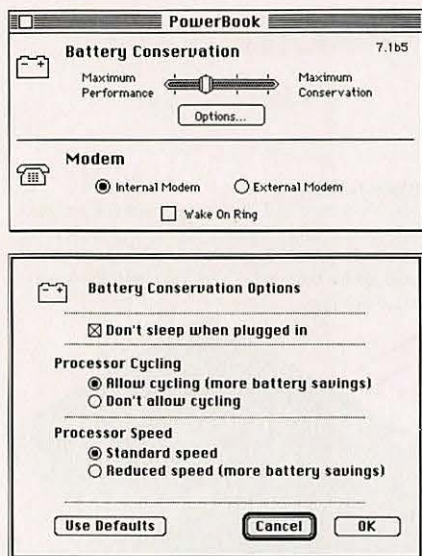
PowerBook Duo 210 4/80	\$2249
Duo MiniDock	\$589
floppy disk drive	\$199
Macintosh Color Display	\$599
extended keyboard	\$229
mouse	\$99
A/C adapter	\$65
extra battery	\$69
battery recharger	\$119
Total	\$4217

FULL DESKTOP SYSTEM



PowerBook Duo 210 4/80	\$2249
Duo Dock	\$1079
Macintosh Color Display	\$599
extended keyboard	\$229
mouse	\$99
A/C adapter	\$65
extra battery	\$69
battery recharger	\$119
Total	\$4508

* Prices listed are for the PowerBook Duo 210; configurations with the PowerBook Duo 230 will be \$360 more.



PowerBook Control The new PowerBook control panel, included with the Duo models as well as the PowerBook 145, 160, and 180, provides more straightforward control over the computer's power-management features than did the old Portable control panel. A single slider (top) now controls hard drive and system sleep times; the old control panel used separate sliders for each. Clicking on the Options button opens the Battery Conservation Options dialog box (bottom). The Processor Cycling option turns off the PowerBook's central processor when it isn't being used; the Processor Speed option lets you slow the processor's speed to 16MHz for additional battery savings.

tains a socket for a video RAM expansion board (a 512K SIMM) that allows for over 32,000 colors on monitors as large as 16 inches. The dock's case can support a monitor that weighs up to 50 pounds. The Duo Dock also has room for a second hard drive (drive size is limited to 3.5-inch platters and a 1-inch-high drive) and an optional 68882 math coprocessor. When installed, the math coprocessor automatically runs at the same clock rate as the Duo you've inserted.

The Duo Dock contains a lock-and-key mechanism that lets you lock the Duo and prevent someone from walking away with it. You can also lock a vacant dock to prevent someone else from using it. The Duo Dock includes a standard ADB mouse, but does not include a keyboard.

The biggest compromise in the Duo Dock concerns the NuBus slots. In order to keep the dock's size down, Apple placed the slots underneath the dock's PowerBook bay. To access the slots, you must

remove the upper case lid, disconnect the power supply, remove two screws, and then remove and invert the Duo Dock's insides. Also, because NuBus boards lie parallel to your desktop, rather than at right angles to it as in most other Macs, you must remove the top NuBus board to access the bottom board. If you plan to swap boards extensively, these gymnastics may become bothersome.

Prepare for Departure

WHEN IT'S TIME TO GO, PUSH THE Duo Dock's Eject button. If any unsaved documents are open, you're asked if you want to save them. That accomplished, the PowerBook Duo shuts down and the dock ejects it. (You can also use the Duo Dock's key to manually eject the PowerBook should a power failure occur.)

Some docking stations have been available in the IBM PC world, but they lack the polish of the Duo system. None provide a motorized insert-and-eject mechanism, for example; instead they rely on strictly mechanical docking schemes that force you to push with some oomph to dock the computer.

But the Duo Dock's motorized mechanism does more than eliminate pushing. Because it's tied to the PowerBook's system software, the dock can inform the PowerBook that you have pushed the Eject button, giving the PowerBook a chance to ask if you want to save unsaved documents. Other notebook computers and docking stations lack this intelligence. You can, for instance, undock an MS-DOS portable even if unsaved documents are open. If you do, you lose work.

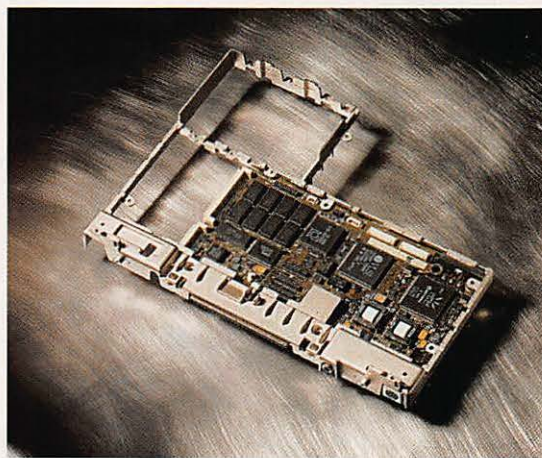
The underlying glue that ties together the PowerBook Duo and a docking station is a collection of hardware and software that Apple calls PowerLatch. In general, PowerLatch allows for easier transitions between portable and desktop computing. It works behind the scenes to keep you from losing work when you press the Duo Dock's Eject button. It also automatically configures the PowerBook for docked operation, activating the dock's math chip and video RAM ex-

pansions if they're installed, switching from LocalTalk to Ethernet if you have an Ethernet board installed, and temporarily disabling any power-saving options that you have activated.

Docking on the Road

WHEN YOU NEED PORTS ON THE ROAD, there's the 1.5-pound Duo MiniDock, which snaps onto the back of the PowerBook Duo and adds a standard complement of ports, including ones for an external floppy drive and a color monitor (see "Getting Connected"). As with the new PowerBook 160 and 180, you can specify that an external monitor be treated as an extension of the PowerBook Duo's desktop or that it mirror the contents of the PowerBook display. The latter option is handy for presentations. Also like the PowerBook 160 and 180, the PowerBook Duo-MiniDock combination supports the SCSI disk mode that debuted in the PowerBook 100—you can connect the MiniDock to a desktop Mac and then use the PowerBook Duo's hard drive as you'd use any SCSI drive.

If you need only an external floppy drive, there's the Duo Floppy Adapter, which also provides an ADB port for a mouse and keyboard. PowerLatch technology also streamlines connections to the portable docking stations. For example, if you connect either dock to a sleeping PowerBook Duo, you can wake up the computer and immediately use an exter-



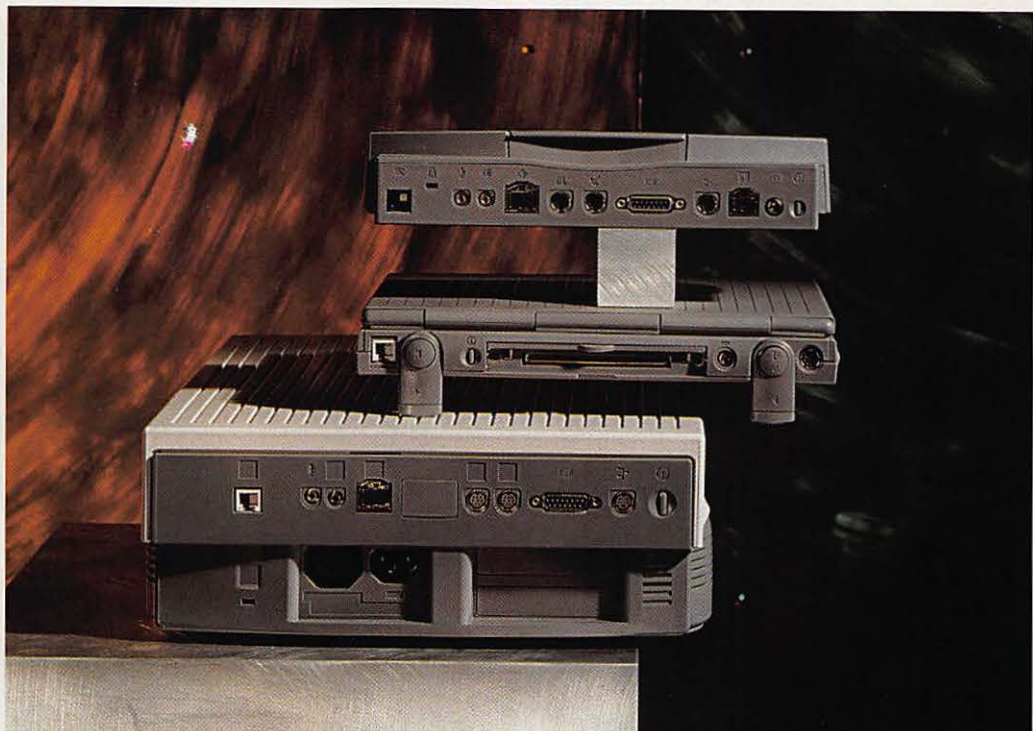
Interior Strength Both PowerBooks have a unique magnesium frame, shown here, that provides enough rigidity to the case to ensure that the computer and docking station align properly during docking. One part of the frame extends out over the logic board, covering the 68030 CPU. This extension functions as a heat sink, drawing off heat and dissipating it.

Duo MiniDock From left to right: modem, security cable hole, sound-in and -out, SCSI connector, two serial ports, DB-15 video connector, ADB, floppy port, power, on/off.

PowerBook Duo 230

From left to right: modem, rear foot in up position, reset button, door covering 152-pin expansion connector, power plug, rear foot, LocalTalk port.

Duo Dock Top from left to right: modem, sound-in and -out, SCSI connectors, a plug for a future upgrade, two serial ports, DB-15 video connector, ADB, on/off. Bottom from left to right: security cable hole, power plug, monitor power passthrough, two NuBus slots.



Comparing Ports Stacked up here in order are the Duo MiniDock (top), PowerBook Duo 230, and the Duo Dock. As you move from top to bottom of this photo, you increase your possible connections to the outside world as well as your expansion options.

nal floppy drive—you don't have to waste battery power by restarting.

Interestingly, the MiniDock and Duo Floppy Adapter were developed and are manufactured for Apple by SuperMac. It's the first joint-development relationship of its kind between Apple and a U.S.-based hardware manufacturer. (Apple has similar relationships with Sony, Sharp, and Toshiba.)

A MiniDock is in many ways a small multifunction expansion board. Several other hardware developers are working on portable docking stations of their own. E-Machines is developing a presentation-oriented station that will provide several types of video-out connectors. Dayna is working on a station that will provide Ethernet and SCSI ports. One vendor is working on a cellular telephone dock that will act as a conventional cellular phone when not docked, and as a cellular modem when docked.

Is a Duo for You?

WITH THE ARRIVAL OF THE DUO SYSTEM, new PowerBooks, and the Macintosh IIfx (see "The Macintosh IIfx" in this issue), Apple now provides several ways to get a 25MHz or 33MHz, 68030-based Macintosh. How do you determine which route to take?

Start by immediately discounting the notion that a PowerBook Duo system will save you a lot of money compared with buying a separate desktop Mac and

PowerBook. You will save some money but not all that much, especially when you consider that in the end, after buying all the necessary equipment, you will still have just one computer.

The Duo system becomes particularly expensive if you want to have NuBus slots at the office and a full array of ports when you're on the road. For example, if you frequently need to connect to an external monitor to give presentations when traveling, then you need to buy a MiniDock for the road in addition to the Duo Dock you already purchased for the office. In this case, you're spending \$1079 for the Duo Dock plus \$589 for the MiniDock. Throw in another \$135 if you want a portable floppy drive to connect to the MiniDock. You don't have to buy a Duo Dock, but if you buy just the MiniDock, you forgo the NuBus slots and all the other expansion opportunities that the Duo Dock provides.

The Duo system is more about convenience than it is about saving money. The idea of working with just one hard drive whether or not you're traveling is very appealing. (Of course, it also makes a faithfully followed backup routine essential, since your sole hard drive is subject to the rigors of the road.) Apple says some cor-

porations have expressed interest in buying, say, 50 PowerBook Duos but only 20 Duo Docks that employees would share when they're at the home office. And Apple says universities are interested in populating computer centers with Duo Docks; the students can buy their own PowerBook Duos.

Well-heeled individuals who travel extensively will undoubtedly embrace the Duo system. Technology buffs will love it, too—when it comes to giving demos to friends, it's the best Macintosh yet. But in the end, it may be medium- to large-size organizations that benefit most from this chameleon of a computer.

The Macintosh PowerBook Duo system doesn't bring the demise of the desktop computer any closer, but it definitely sets new standards for notebook-and-docking-station systems—standards DOS notebook vendors are unlikely to match, at least not unless Microsoft incorporates PowerLatch-like technology into MS-DOS and Windows. With the PowerBook Duo system, Apple has again shown what kind of elegant, tightly integrated computing is possible when the hardware and the system software come from the same company. **m**

Contributing editor JIM HEID has been working with portable computers ever since the Tandy 100 appeared. He covers the PowerBook Duo system in the second edition of his book *Inside the Apple Macintosh* (Brady, 1992).



New PowerBooks

The 145, 160, and 180

Apple's latest notebooks add monitor support, gray-scale screens, and faster speeds

It looks like Apple's getting the hang of this notebook computer thing. For years, loyal Macintosh users waited patiently for a laptop—only to be soundly disappointed by that big lug, the Portable. But last fall Apple finally came out with the sleek

PowerBook line and within months sold 300,000 of the notebook computers—which were named among 1991's best new products by *Fortune*, *Time*, and *Business Week* magazines. One year later, Apple has unveiled no less than five new PowerBooks to replace the original 100, 140, and 170 models.

The new releases divide the PowerBook family into two camps: the 145, 160, and 180 are enhancements of the all-in-one notebook design, while the PowerBook Duo 210 and 230 are designed to function both as limited-capability, stand-alone notebooks and as the basis for a complete desktop system (for more on the Duo notebooks, see "Apple's Dynamic Duo," this issue).

True to Apple's notebook approach to date, the PowerBook 145, 160, and 180 models plow no new technological ground. If you're looking for innovative notebooks, you'd be better off in the DOS world, where you find such features as color screens, detachable tilt-and-swivel screens, PCMCIA support (for using plug-in, credit card-size peripherals, such as a fax modem), and a microprocessor (Intel's SL series) with built-in power-management capabilities. These three new PowerBooks are simply more mature products than their predecessors are, with enhancements and improvements based

not on cutting-edge technologies but on what customers didn't like about last year's models.

The PowerBook 145, with a 25MHz 68030 processor and price tags of \$2149 (4MB of RAM, 40MB hard drive) and \$2499 (4MB of RAM, 80MB drive), is a faster, less expensive version of the 140, which had a 16MHz 68030 chip and sold for \$2999 (4MB of RAM, 40MB hard drive) and \$3299 (4MB of RAM, 80MB hard drive). Except for a few minor details, the 145 is the same machine as the 140 (see *News*, *Macworld*, October 1992).

The PowerBooks 160 and 180 are bigger news, however. Both models correct a major omission of the previous PowerBooks by including external video support; now you can easily hook up a gray-scale or color monitor to your PowerBook (the 145 doesn't have a video-out port). The 160 and 180 also offer 4-bit screens with 16 levels of gray-scale, as opposed to the previous PowerBooks' 1-bit black-and-white-only displays. In addition, the 160 and 180 have faster processors, greater RAM and hard drive capacities, and a built-in microphone (see "PowerBooks Compared"). And while the PowerBooks' price range hasn't changed much—\$2149 for the low-end 145 to \$4229 for the 180 model with 4MB of RAM and a 120MB hard drive—you get a more powerful computer for the money.

Video Displays

PERHAPS MORE THAN ANYTHING ELSE, the original PowerBooks lost points with critics and users alike for the lack of a video-out port—a standard feature in most DOS notebooks. It seemed an inex-

by James A. Martin



The PowerBooks 160 and 180 can support color monitors up to 16 inches, such as the Apple 16" Color Displays shown here.

plicable oversight, as the PowerBooks' 32-bit QuickDraw ROM enabled them to drive color or gray-scale monitors. Even the ill-fated Mac Portable had a video-out port, for crying out loud.

Why wasn't that port included in the first PowerBooks? One theory is that Apple was afraid the video-out capability would encourage some people to buy lower-cost PowerBook models instead of more-expensive desktop Macs. A spokesperson for Apple explains that the company simply didn't think there would be enough demand for external monitor support to warrant the efforts to squeeze a video subsystem onto the already-crowded PowerBook logic boards.

Guess what. Apple was wrong. This time around—with the emergence of QuickTime last year creating an even more compelling need for some users to take a presentation on the road and show it off on a big screen—Apple couldn't afford *not* to add a video-out port.

The 160 and 180 offer built-in video support for Apple's 12-, 13-, and 14-inch RGB displays (the 12- and 13-inch monitors have been discontinued in favor of the new 14-inch Macintosh Color Display; see "The Macintosh IIfx," this issue), as well as for Apple's Macintosh Portrait Display and Macintosh 16" Color Display. The 160 and 180 ship with a standard 15-pin video cable for external-monitor hookup.

The 160 and 180 also include built-in video support for VGA and SVGA monitors, commonly used with DOS machines. To connect to those, however, you need to buy a third-party cable adapter, such as the MacVGA product from James Engineering in El Cerrito, California.

The 160 and 180 come standard with 512K of video RAM (VRAM), which enables them to display 8-bit video—256 colors or up to 16 grays—on an external monitor as large as 16 inches. Apple didn't include the option to upgrade to 1MB of VRAM, which would have enabled PowerBooks to drive 16-bit video, or 32,000 colors, on larger monitors, such as the Macintosh 21" Color Display. Again, Apple felt there wouldn't be enough demand for 1MB of VRAM in a PowerBook to warrant squeezing in an extra VRAM socket. (Could the company be wrong? It's happened before.)

Adding an external monitor to a PowerBook is simple: put the notebook to sleep, plug one end of the cable into the monitor cable and the other into the PowerBook video-out port, hit any key to awaken the computer, and you're in business. With the PowerBooks I looked at, there was a brief warming-up period before the PowerBook desktop showed up on the external monitor.

You've got two choices for using an external monitor. A new PowerBook System 7.1 software feature, Video Mirroring, precisely and proportionately mimics on the monitor what's on your PowerBook screen—an advantage for those who are running demonstrations or other presentations from a notebook. The

alternative is the familiar dual-display mode, in which the monitor and PowerBook screens are combined to create one large virtual desktop.

Gray Matters

ANOTHER LIMITATION OF THE PREVIOUS PowerBooks was the black-and-white liquid crystal display (LCD)—despite the fact that the notebooks use 32-bit QuickDraw, which enables them to drive a color LCD. (Newer Technology unveiled a \$5000 active matrix color screen for the PowerBooks at the August Macworld Expo, and Apple is working on a color active matrix screen for release in 1993.)

With the PowerBook 160 and 180 models, Apple has added LCDs capable of displaying 16 levels of gray. These two PowerBooks have different screen technologies, though: the 160 employs a backlit passive-supertwist LCD, while the 180 uses the more advanced (and more expensive) backlit active matrix LCD. Apple added a shadow-mask feature to the 180, which helps increase contrast between screen pixels. As a result of these differences, the 180's screen is visibly superior to the 160's—gray-scale images appear richer and deeper, with greater clarity and photo-realistic shadings.

Unfortunately, the supertwist screen in the 145 and 160 models still suffers from such maladies as *banding*, the visible transition between pixels, particularly noticeable in high contrasts or gradients; *crawlies*, or tiny, visible currents on the screen that resemble the kind of movement you see in an organism under a microscope; *submarining*, the momentary

submergence of the pointer when you move it quickly from point A to point B; and *ghosting*, which makes frequently displayed icons, menu bars, or other items appear to become a permanent fixture on the screen.

These problems aren't Apple's fault—they're a limitation of current screen technologies—and they aren't quite as distracting as the same problems were on the 100 and 140 models, thanks partly to improvements in screen brightness, light diffusion, and contrast controls that Apple made to the 160 and 180.

Will gray-scale really be an advantage for PowerBook users? For some people, it simply won't matter, and they should be satisfied with the PowerBook 145, which has the same black-and-white backlit supertwist LCD as the 140. But for others—those who are generating or viewing presentations, QuickTime movies, or graphics on PowerBook screens—the answer is an unqualified yes. Displaying a gray-scale or color image on a 1-bit black-and-white screen generates a posterized, or high-contrast, effect—certainly not as accurate a representation as on the new PowerBook 4-bit screens, with their 16 levels of gray.

Speed Thrills

APPLE CLAIMS THAT THE POWERBOOK 180, with its 33MHz 68030, and the 160, with the 25MHz 68030, offer speed performances that are 7 and 4.5 times faster

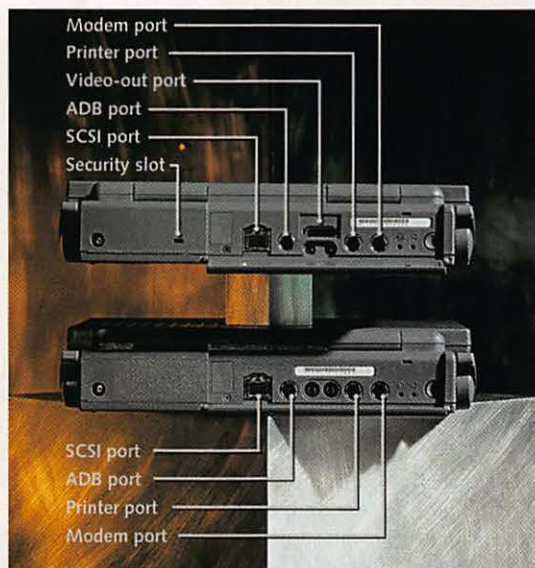
than the 8MHz 68000-based Macintosh Classic, respectively. A more accurate test, though, is to pit the new PowerBooks against MS-DOS/Windows notebooks and the Outbound Notebook System 2030S Macintosh-compatible laptop (see "How Fast Are the PowerBooks?").

If sheer unadulterated speed is your most important notebook-buying criterion, you'd be better off with Texas Instruments' TI TravelMate 4000 WinDX/25 than with any other notebook we tested. Based on the 80486 microprocessor, the TravelMate has no serious performance rival among the PowerBooks—in everything but the Word and Excel scroll tests, the TravelMate screamed by all of its competitors.

Granted, the 486 chip is equivalent to the 68040, and the current batch of PowerBooks all employ the older, and slower, 68030 CPU. Nonetheless, when you consider cost and features, it is a fair comparison—the TravelMate comes standard with 4MB of RAM (upgradable to 20MB), a 120MB hard drive (upgradable to 200MB), and a 640 by 480 VGA gray-scale screen; and the TravelMate retails for \$3299—a whopping \$1000 less than the Power-

Book 180 with the same amount of RAM and hard drive space.

The Outbound 2030S outperformed its closest PowerBook competitor, the 180, in each test category. (We evaluated both 33MHz 68030-based notebooks with 68882 floating-point units [FPUs]; the FPU is included in the 180 but is sold as a \$250 option for the Outbound system.) In addition to providing better performance, the 2030S is much easier to up-



Back panels of the PowerBooks 160 (top) and 145. (The PowerBook 180's back panel is identical to the 160's.) The 160 and 180 feature new video-out ports and security slots.



How Fast Are the PowerBooks?

Processor Tasks

Two tests indicate processor performance: recalculating a Microsoft Excel file (including simple arithmetic functions) and performing a search and replace in Microsoft Word.

Drive Access Tasks

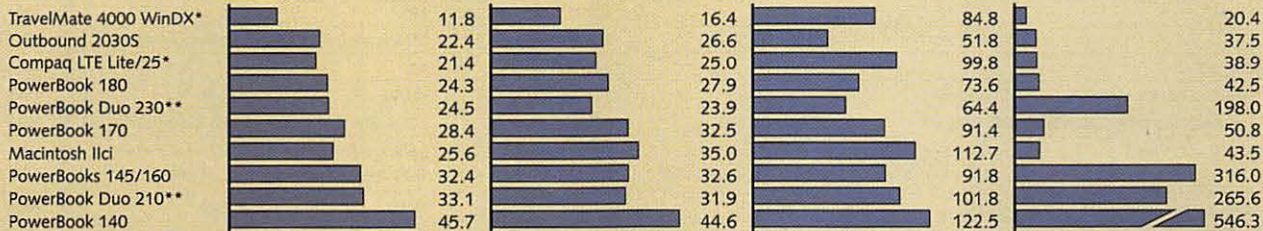
Two tests represent overall performance for tasks involving intensive access to the hard drive: opening an 890K Excel file and a 212K Word file.

Display Tasks

Two scrolling tests—in Excel and Word—show processor performance during screen redrawing.

Math Tasks

A test in Excel—consisting of complex arithmetic functions—indicates math coprocessor performance. In computers without a coprocessor, tasks were performed by the main processor.



Times are in seconds. Shorter bars are better.

* DOS notebooks tested with MS-DOS 5.0 and Windows 3.1. ** Tests conducted without FPU, which is built into the Duo Dock.

The new PowerBooks 145 and 160 are noticeably faster than the older 140; the new 180 is faster than the older 170. In some cases all three new PowerBooks outperform a desktop Mac IIfx. Two comparable DOS/Windows laptops and Outbound's Macintosh-compatible beat all the Power-

Books. The PowerBooks 140, 145, and 160 do not have math coprocessors. For all tests we used Microsoft Word and Excel because they have comparable versions for the Windows and Macintosh systems.

grade than a PowerBook—that should give pause to any potential notebook buyer (see *Reviews*, September 1992, for more on the 2030S).

Despite the speed advantages of the TravelMate and Outbound, one simple fact will probably keep many readers of this magazine from seriously considering these notebooks—neither one is an Apple Macintosh. With that in mind, suffice it to say that the new PowerBooks are certainly an improvement over their predecessors—for example, the new low-end model, the 145, has the same 25MHz 68030 CPU as the 170, the former high-end PowerBook. And the new PowerBooks perform favorably compared with the 25MHz 68030-based desktop Mac IIci (with 68882 FPU), which in most cases is more than enough raw power for those on-the-road computing tasks.

Memory Gains

YOU CAN STOP FRETTING OVER THE PowerBook's ridiculously low RAM and hard drive capacities, as Apple has installed a standard 4MB of RAM in each new PowerBook. The 160 and 180 can be upgraded to a total of 14MB—the previous PowerBook limitation was a scanty 8MB. The PowerBook Duo 210 and 230 models, however, can support up to 24MB of RAM (see "PowerBooks Compared").

A few caveats are in order regarding RAM and the new PowerBooks. First, as was the case with the original PowerBooks, Apple strongly advises owners against installing RAM upgrades themselves; some users have fried their logic boards attempting to do this. There are too many things that can go wrong, Apple warns, and you can void your warranty if

anyone other than an authorized Apple dealer fiddles around inside the computer. The truth is, any reasonably savvy computer user can install RAM, but with a warranty at stake, why take the chance?

Second, don't install just any RAM upgrade inside a PowerBook 180. Because that model features the fast 33MHz 68030 processor, the RAM chips added must run at least at 85 nanoseconds or they'll cause the processor to pause before completing a task—in techy terms, that's called a wait state. It's no tragedy, but why spend money on a fast processor only to slow it down slightly with a 100-nanosecond RAM upgrade?

As for hard drives, the good news is that you can buy a PowerBook 160 or 180 with a 120MB hard drive installed—a logical improvement over the 80MB ceiling of last year's high-end PowerBooks. Currently, though, 160MB is the limit for the 2.5-inch hard drive (increasingly common in laptops); that's sure to increase within months, of course. Sounds like another third-party opportunity to me.

Power Savers

APPLE SPENT SOME TIME THINKING about how to get more juice out of the PowerBook's nickel-cadmium batteries, which enabled Apple to add such features as video-out support, higher-capacity hard drives, and better screens, without much additional strain to the power supply.

With the original PowerBooks, you could put the hard drive to sleep after a period of time that you specified; this

saved power, but you had to wait a few seconds for the drive to reawaken whenever you saved a file or performed some other task. Apple has revised this feature into a control bar (located within the PowerBook control panel) that allows you to choose Maximum Performance (in which the hard drive rarely sleeps), Maximum Conservation (in which the hard drive snoozes after every five minutes of disuse), or any ambiguous space in between (see "Apple's Dynamic Duo," in this issue). But no matter what Apple calls this feature, you still have to wait for the hard drive to wake up before getting back to work. (For more information on PowerBook battery enhancements, see *Lab Notes*, in this issue.)

SCSI Improvements

THE POWERBOOK 100 WAS UNIQUE within the first Mac notebook family in that it could be connected to a desktop Mac as a SCSI device—handy for copying files from one computer to another or, if nothing else, turning your PowerBook into an external hard drive.

This wasn't possible with the 140 and 170, though. The ability to run in SCSI mode is contained within a PowerBook's ROM; Sony, which designed the 100 with Apple, added the SCSI capability to that computer. Meanwhile, Apple was developing ROM that would work with the 140 and 170, as well as the Quadra 700 and 900, which were under development at the same time. Apple says that it didn't add SCSI-mode capability to the PowerBook/Quadra ROM mainly because it thought the more sophisticated notebook users, those buying the 140 and 170, would prefer to exchange files via network

POWERBOOKS COMPARED

	Original PowerBooks			New PowerBooks		
Model	100	140	170	145	160	180
CPU	16MHz 68HC000	16MHz 68030	25MHz 68030	25MHz 68030	25MHz 68030	33MHz 68030
Coprocessor	no	no	68882	no	no	68882
Standard RAM/expanded	2MB/8MB	2MB/8MB	2MB/8MB	4MB/8MB	4MB/14MB	4MB/14MB
Standard hard drive/expanded	20MB/40MB	40MB/80MB	40MB/80MB	40MB/80MB	40MB/80MB, 120MB	80MB/120MB
Backlit LCD type	passive supertwist 1-bit black-and-white	passive supertwist 1-bit black-and-white	active matrix 1-bit black-and-white	passive supertwist 1-bit black-and-white	passive supertwist 4-bit gray-scale	active matrix 4-bit gray-scale
Screen size	9 in.	10 in.	10 in.	10 in.	10 in.	10 in.
Computer size ²	11 × 8.5 × 1.75	11.25 × 9.3 × 2.25	11.25 × 9.3 × 2.25	11.25 × 9.3 × 2.25	11.25 × 9.3 × 2.25	11.25 × 9.3 × 2.25
Weight	5.1 lbs.	6.8 lbs.	6.8 lbs.	6.8 lbs.	6.8 lbs.	6.8 lbs.
Battery type	lead acid	nickel-cadmium	nickel-cadmium	nickel-cadmium	nickel-cadmium	nickel-cadmium
Ports	1 serial; SCSI; ADB; floppy drive; sound output	2 serial; SCSI; ADB; sound input/output	2 serial; SCSI; ADB; sound input/output	2 serial; SCSI; ADB; sound input/output	2 serial; SCSI; ADB; sound input/output; video out	2 serial; SCSI; ADB; sound input/output; video out
Suggested retail prices	\$1599 ⁴	\$2999–\$3299 ⁵	\$4299–\$4599 ⁵	\$2149–\$2499	\$2429–\$3149	\$3869–\$4229

¹ Math coprocessor available through docking stations only. ² Width × depth × height, in inches. ³ Other ports available through docking stations only. ⁴ Apple and Sony mand. Price is for 2/20 configuration. ⁵ Model discontinued; figures reflect last prices set by Apple. ⁶ Prices do not include docking stations or accessories.

connections and System 7's file sharing.

Guess what. Apple was wrong. But they learned their lesson—sort of; the 160 and 180 can serve as SCSI devices, but not so the 145 (remember: it's basically just a 140 with a new processor).

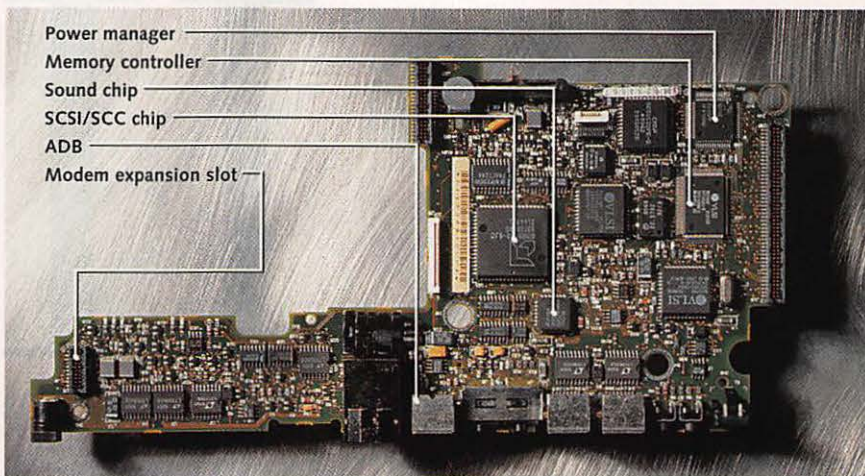
To round out the 160 and 180, Apple has added a reassuring security port near the AC adapter that enables you to lock the PowerBook to a desk with a third-party device, such as Kensington's \$59.95 MicroSaver. And finally, the PowerBook 160, 180, and Duo models include a built-in microphone—good news for those who tend to misplace things. Capturing voices might be a bit more difficult now, however. On the PowerBook 140 and 170 you can hold the microphone right up to your lips for optimal sound input; in order to get as close to the 160 or 180 mike as possible, you've got to awkwardly aim your mouth in the area between the screen and the keyboard, where the mike is located.

Complex Choices

WITH FIVE NEW POWERBOOKS, DECIDING which one to buy can feel a bit like a visit to the supermarket to select just the right breakfast cereal—there are almost too many choices.

Price alone was once a strong determining factor in a PowerBook purchase, but that's no longer the case. For example, let's say you can afford to spend around \$2500 on a PowerBook, but you want the best you can buy with that money. Six months ago, that meant you had only one choice: a PowerBook 140 with 4MB of RAM and an 80MB hard drive, with a street price of about \$2400.

Today, you've got several options in the vicinity of \$2500, based on expected



PowerBook 160 main logic board. Piggyback board (not shown) contains CPU, video-out connector, gray-scale controller, VRAM, RAM, and ROM.

store prices: the PowerBook 145, with 4MB/80MB configuration; the 160, with 4MB of RAM and an 80MB hard drive; or a PowerBook Duo 210, with 4MB of RAM, an 80MB hard drive, an external 1.44MB SuperDrive, and a floppy/ADB adapter. Now what do you do?

The biggest question is whether to buy a "traditional" PowerBook or one of the Duo models. Aside from their role as part of the docking system, the Duo models certainly have the edge in portability—4.2 pounds compared with most PowerBooks' 6.8 pounds. Also, the Duos are highly flexible—you can buy as few or as many ports and accessories as you like; the Duo design is the foundation for next year's PowerBooks, according to Apple; their RAM is more expandable; and their batteries last longer.

So why wouldn't you want to buy a PowerBook Duo? Their screens are slightly smaller than other PowerBooks' (9.1 inches diagonally versus the standard PowerBooks' 10-inch screen) and are backlit supertwist only; the keyboard keys are more crowded; and the Duos have a smaller trackball that could be too concave and petite for some users—all of which would make using a PowerBook Duo for any lengthy period of time unpleasant. You can get around most of these shortcomings, but only by adding the external Duo Floppy Adapter, Duo MiniDock, or full Duo Dock docking station, thus spending more money and acquiring more pieces.

If you need both a desktop and a mobile computer, and your desktop computer needs aren't too ambitious, you can get by quite nicely without a PowerBook Duo docking system. For just under \$3000 you can hook up an external keyboard and Apple 14-inch color monitor to a PowerBook 160 and have a solid, if limited, desktop computer (PowerBooks have

no expansion capabilities aside from memory, hard drives, and modems). When you're ready to travel, just unhook the two peripherals and you're off.

The bottom line is that the Duos were designed as the mobile part of a desktop system, not as completely self-sufficient computers.

Among the fully configured PowerBooks, the 145 is a good choice for anyone who needs a notebook computer only for occasional computing on the road. Keep in mind, though, that there's no video-out port, no SCSI-mode support, and no security port.

Choosing between the 160 and 180 is easy if you work with graphics, plan to spend long hours on the PowerBook, or need all the processing power you can get—in those cases, the 180 is the winner because of its superior screen, 33MHz 68030 CPU, and math coprocessor. Aside from that, deciding between the two is purely an economic decision, as they are otherwise identical.

Watch This Space

THERE ARE STILL PIECES MISSING from the new PowerBook lineup that some Mac fans will find irksome—most notably, no built-in Ethernet or MIDI support, and no upgrade path from the 140 or 170.

Still, Apple's done a good job in offering the kind of fast, easy-to-use Macintosh notebook that mainstream users clamor for. And if the new PowerBook features and enhancements aren't enough for you, just wait—same time next year, Apple will undoubtedly be showing off its next generation of PowerBooks. **m**

See *Where to Buy* for contact information.

Macworld Lab testing supervised by MARK HURLLOW and TIM WARNER.

PowerBook Duo Models

210	230
25MHz 68030	33MHz 68030
no ¹	no ¹
4MB/24MB	4MB/24MB
80MB/NA	80MB/120MB
passive supertwist	passive supertwist
4-bit gray-scale	4-bit gray-scale
9.1 in.	9.1 in.
10.9 × 8.5 × 1.4	10.9 × 8.5 × 1.4
4.2 lbs.	4.2 lbs.
nickel-metal-hydride	nickel-metal-hydride
sound input/output; expansion connector ¹	sound input/output; expansion connector ¹
\$2249 ⁶	\$2609–\$2969 ⁶

will continue to manufacture as long as there's a de-

The Macintosh IIvx

The latest desktop Mac is a faster version of the Performa 600



What's the Difference?

THE IIvx IS THE SAME AS THE PERFORMA 600 on the outside, and it takes the same size hard drives and same types of peripherals as the Performa 600. When you look inside the case, you see the same 32MHz 68030 processor as well as some critical additions. First, the math coprocessor socket features a 68882 floating-point chip snugly in place. There's really no reason Apple should have put a math chip in all those boxes it hopes to sell at Sears, since most business or education programs will not speed up with the addition of a floating-point chip. And if those users do need a 68882, they can add one for less than \$100.

It's the second difference that's critical: the IIvx includes 32K of cache memory soldered to the logic board. Macworld Lab tests show that this seemingly modest amount of memory makes the IIvx 35 percent faster than the Performa 600 at some processor-intensive tasks (finding and replacing text in Word, for instance) and 25 percent faster at other chores (such as scrolling). Now you don't want to solder chips to the board yourself (trust me on this), so your only option to bring the Performa 600 up to IIvx speeds is to buy an accelerator board.

But let's think about that. The accelerator slot in the Performa 600 (and IIvx for that matter) requires an accelerator with its own processor, cache chips, and cache logic. Since boards loaded with this chip set sell for \$600 to \$800, you can only get a Performa 600 up to IIvx speeds

If you think this Mac looks familiar, you're right—you saw it gracing the cover of our November issue, only under a different name. The Macintosh IIvx is a higher-performance version of the consumer-channel Performa 600 that Apple introduced in

September. It features the same case, the same basic logic board, the same attractive built-in CD ROM drive option, and the same input/output capabilities. It will be sold with the standard version of System 7.1, not with the Launcher/At Ease interface layer sold with Performas. The question about the IIvx is simple: is it worth nearly \$700 more than a Performa 600?

by Charles Seiter

if you pay the same as what a IIvx costs in the first place.

Apple has blessed the IIvx with the best price-to-performance ratio of any computer it has ever built. The IIvx is the dealer's midrange champion (the Performa 600, in contrast, is the high end of the consumer line), with Classics and LCs strictly entry-level machines and Quadras for graphics- or computation-intensive uses. The IIvx with 4MB of memory, an 80MB hard drive, and 512K of video RAM will list for \$2949; a IIvx with a higher-capacity 230MB hard drive costs \$3319. A IIvx with the AppleCD 300i high-speed CD ROM drive, Kodak Photo CD and CD sampler, 1MB of video RAM for 32,000 colors, and 5MB of main memory will cost \$3219, a mere \$270 more than the IIvx with 4MB of memory and an 80MB hard drive. At these prices, the IIvx is certainly a good value.

While Apple will offer the IIvx to all of its international markets, the company will offer a lower-performance, lower-cost model called the IIvi to users in Europe and the Pacific. The 68030 processor in the IIvi runs at 16MHz instead of 32MHz, there's no 68882 math coprocessor (although there is a slot to add one in), and there's no cache. The base IIvi with 4MB of memory and an 80MB hard drive will cost \$2900—about the same as the IIvx in the United States.

A Better Monitor

TO ACCOMPANY ITS BEST-EVER VALUE in computers, Apple is introducing a best-ever value in monitors. The Macintosh Color Display (which replaces the 13-inch

AppleColor High-Resolution RGB Monitor and the 12-inch Apple RGB display) offers some real innovations, improved ergonomics, and a bit of press-agentry. The press-release engineering is easiest to describe. For years the AppleColor Monitor has been called 13-inch, an honest reference to the true diagonal size of the image area. Since most of the rest of the world calls the same picture tube 14-inch, this new standard Apple monitor, with the same picture dimensions as the old one, has been proudly redesignated a 14-inch monitor.

Although Apple's old 13-inch AppleColor was no slouch on quality, the new Color Display is even better in some areas. Macworld Lab tests show that the Color Display has less distortion, has better brightness, and displays colors and grays truer to their specifications. The 13-inch AppleColor has a better contrast ratio and better convergence.

Ergonomic improvements, too, are genuine. Brightness, contrast, and power switches are on the front of the monitor. A tilt-and-swivel base provides smooth positioning over a wide range. But the most important improvements are electronic: the monitor's electronics fit on a single small circuit board that gives higher beam current for more brightness, and automatic degaussing on start-up to eliminate distortion and moiré patterns. The display offers a standard 640 by 480 pixels and 70 dots per inch, but the electronic improvements have brought the weight down to 24 pounds (compared with 34 pounds for the old AppleColor Monitor) and the price down to \$599 (from \$999). You'll be able to get a system that's as fast as a IIci, with

a great monitor, for about \$3500. Compared with last year's Macintosh prices, a IIvx system's price is a sensational deal—in fact, you may as well treat yourself to the CD ROM drive version.

How Does It Rate?

APPLE HAS ANNOUNCED THAT IT WILL offer an upgrade path for the IIvx. Third-party vendors will also offer accelerators (the PowerCache from DayStar Digital has been tested and approved). The IIvx has three NuBus slots and a 112-watt power supply, so you can add standard boards. If you buy the version with the AppleCD 300i installed, you will have the best CD ROM drive bargain ever offered.

If you are a dissatisfied inhabitant of the Plus/Classic/SE universe, or own an LC and are annoyed at its relative lack of performance, you should get a IIvx rather than a Performa 600 or an upgrade board for your current hardware. Unlike the LC and the IIci, the IIvx has a straightforward upgrade path, and you can expect to hold onto your II investment for years. On performance grounds alone, the Performa 600 is for home users who want a CD ROM drive and room to expand, while the IIvx is ready to do serious database and spreadsheet work right out of the box. With or without the CD ROM drive, the IIvx is going to be a best-seller and the right choice for most office and home-office users through the mid-1990s. **m**

CHARLES SEITER is a *Macworld* contributing editor.

Macworld Lab testing supervised by MARK HURLLOW and TIM WARNER.



How Fast Is the Macintosh IIvx?

Processor Tasks

Four tests indicate processor performance: performing a search and replace in Microsoft Word, previewing and magnifying in Aldus FreeHand, and sorting in Claris FileMaker Pro.

Drive Access Tasks

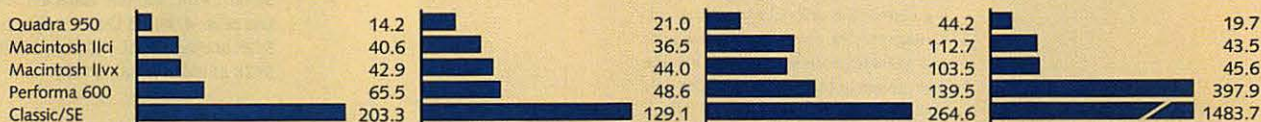
Two tests represent overall performance for tasks involving intensive access to the hard drive: opening an Adobe Photoshop file and duplicating a 3.2MB file.

Display Tasks

Two scrolling tests—in Microsoft Excel and Word—show processor performance during screen redrawing.

Math Tasks

A test in Excel—consisting of complex arithmetic functions—indicates math coprocessor performance. In computers without a coprocessor, tasks were performed by the main processor.



Times are in seconds. Shorter bars are better.

The new Macintosh IIvx sports a slightly faster processor than the IIci and includes a built-in cache. Yet when we tested the IIvx against a IIci that includes a cache card, the IIvx ran a bit slower overall. The Performa 600,

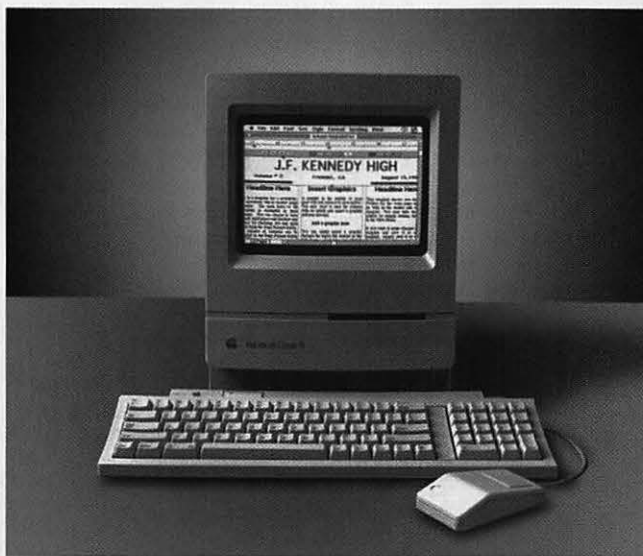
which is a IIvx without any cache memory or a math coprocessor, runs noticeably slower than a IIvx. All of these Macs, however, far outrun the Classic and SE.

Looking Down

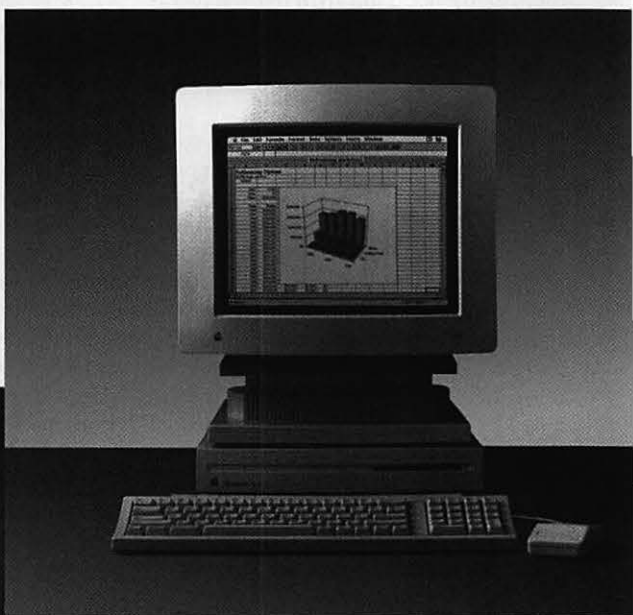
With all the new Macs, how do you decide which one is for you?

With October's new product introductions and price changes, Apple has positioned Macintoshes at smoothly graded intervals on a price-and-performance scale. Even the PowerBooks are priced so that you pay only a small premium for portability. If you're wondering where you fit into this picture, read on.

by Cheryl England



Mac Classic II The Classic II (called the Performa 200 in retail stores) is Apple's only computer that retains the compact, appealing case of the original Mac. Other advantages for this machine are its low price and a 68030 processor that puts it in the mainstream of Mac computing. The only real drawback to the Classic II is its lack of color. So why don't we just love this Mac? Because it feels outdated. The Classic II performs acceptably, but lacks the zip of the discontinued SE/30—and that's a disappointment. **Processor:** 16MHz 68030. **Video support:** black-and-white. **Slots:** none. **Memory capacity:** 10MB. **List price:** 4/40, \$1079; 4/80, \$1209.

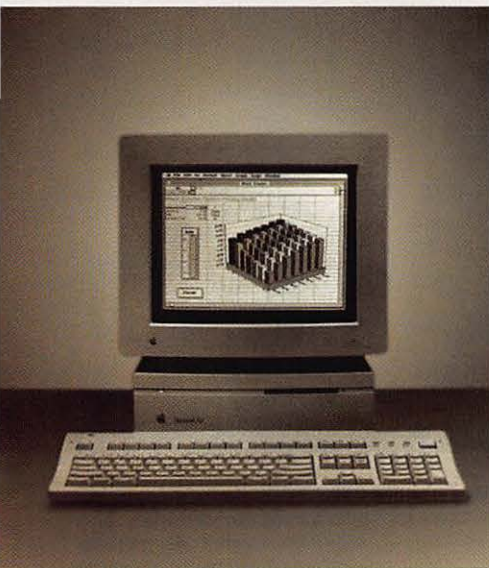


Mac LC II Apple has dropped the price on its lowest-cost color Macintosh, the LC II, even more, making this machine a bargain-hunter's dream. To understand the value of an LC II, look at it this way: with an Apple 13-inch monitor, the LC II costs about \$750 more than a Classic II and includes built-in color, more expansion capability, and a larger screen. We highly recommend the LC II (called the Performa 400 in retail stores) for schools, homes, and businesses where administrative chores such as word processing and budgeting are the normal activities. **Processor:** 16MHz 68030. **Video support:** color. **Slots:** 1 PDS. **Memory capacity:** 10MB. **List price:** 4/40, \$1239; 4/80 (with 512K of video RAM), \$1349; 4/160 (with 512K of video RAM), \$1489.

the Line

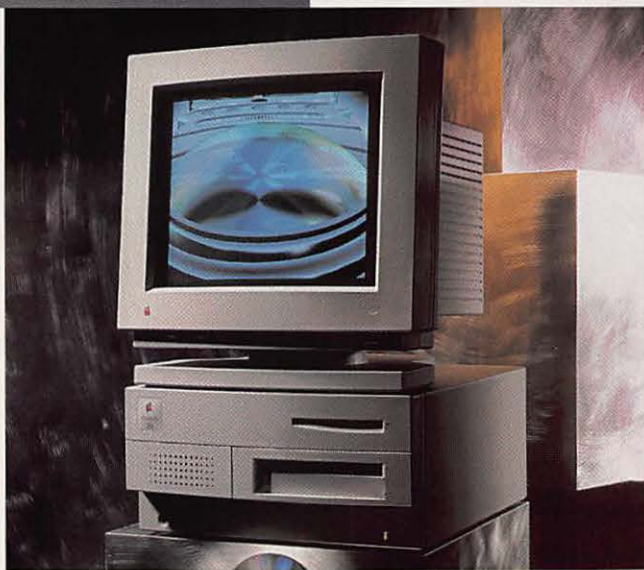
Mac IIfx

For a long time the Macintosh IIfx has held down the middle ground of Apple's machines. Compared with the IIsi, the IIfx is a tad faster, offers more slots for adding expansion boards, and comes with a math coprocessor. You can upgrade the IIfx to a Quadra 700 (one of Apple's workstation-class machines), so it's not a dead-end Mac. But Apple has already announced that it will provide an upgrade for the IIfx; when that happens there won't be any reason to purchase a IIfx over a IIfx. **Processor:** 25MHz 68030. **Video support:** color. **Slots:** 3 NuBus, 1 cache. **Memory capacity:** 32MB. **List price:** 5/SuperDrive, \$2539; 5/80, \$2719; 5/230, \$3089.



Mac IIsi

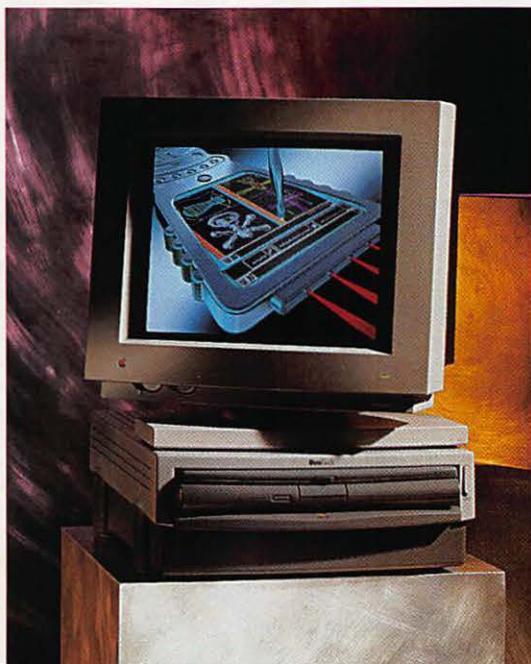
The IIsi is slightly faster than the LC II and comes with an extra 1MB of memory in the basic configuration—and for that Apple charges an additional \$500. Apple offers no upgrade path for this Macintosh and, as with the LC II, the slim case limits expansion options. You're better off buying either a bargain-priced LC II or investing a bit more heavily for the new IIfx (the Mac we're betting will become Apple's midrange champion). **Processor:** 20MHz 68030. **Video support:** color. **Slots:** 1 PDS or 1 NuBus. **Memory capacity:** 17MB. **List price:** 3/40, \$1749; 5/80, \$1999; 5/160, \$2139.



Mac IIfx

The base IIfx offers all the features of the IIsi plus more, and yet costs only \$200 extra. The IIfx runs at the same speed as a IIsi with a cache card—and that's before adding a third-party accelerator into the IIfx's special slot (a slower version of the IIfx is sold through retail stores as the Performa 600). What makes this Mac even more of a bargain is Apple's offer of a speedy, high-quality, internal CD ROM drive for only \$300. For a traditional desktop system with more punch and features than the LC II, the IIfx can't be beat. **Processor:** 32MHz 68030. **Video support:** color. **Slots:** 3 NuBus, 1 accelerator. **Memory capacity:** 68MB. **List price:** 4/80, \$2949; 4/230, \$3319; 5/80 with CD ROM drive, \$3219.

If we could afford PowerBook 180s, we'd



Mac Duo Dock This odd-duck product, with a companion Duo PowerBook, costs about the same as a IIvx with a CD ROM drive. The Duo Dock is a chassis with two slots, a storage bay, built-in color video, and standard ports. The heart of the Duo Dock—and the part that provides this Mac's logic board—is a new PowerBook, the Duo 210 or 230. When the PowerBook Duo 210 or 230 is inserted, the Duo Dock works like a desktop Mac. Alternatively, the Duo 210 or 230 can be pulled out and taken traveling, just like a standard PowerBook. Reactions here have been mixed—some of us would love to be first to try it, while others would rather wait to see if it really is the best of both worlds. **Processor:** Duo 210, 25MHz 68030. Duo 230, 33MHz 68030. **Video support:** color. **Slots:** 2 NuBus. **Memory capacity:** 24MB via the Duo. **List price:** \$1079 (docking station only).



Mac Quadra 700 Both the Quadra 700 and Quadra 950 are built from the ground up for performance. Both have speedy processors, fast SCSI and NuBus connections, hefty power supplies, and built-in support for 24-bit color. The Quadra 700 is a tad slower than the 950 and has less built-in memory and fewer internal expansion options. It's also cheaper. **Processor:** 25MHz 68040. **Video support:** color. **Slots:** 2 NuBus, or 1 NuBus and 1 PDS. **Memory capacity:** 20MB. **List price:** 4/SuperDrive, \$4219; 4/80, \$4669; 4/230, \$5039; 4/400, \$5849.

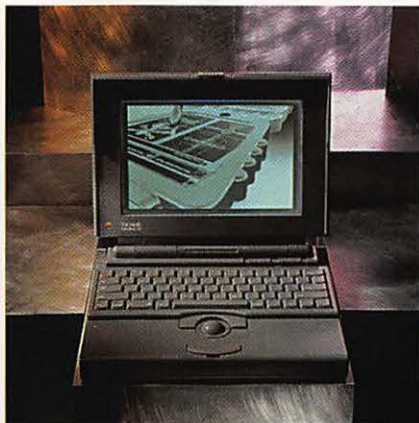


Mac Quadra 950 The Quadra 950 is Apple's top-of-the-line performance machine. It has more slots than the 700, a larger power supply, and a slightly faster processor. We highly recommend either Quadra for users with demanding applications such as prepress work, complex illustration, page design, or 3-D modeling. The 950 is best suited for video work and other applications where throughput, maximum memory, and peripherals are of ultimate importance. **Processor:** 33MHz 68040. **Video support:** color. **Slots:** 5 NuBus, or 4 NuBus and 1 PDS. **Memory capacity:** 64MB. **List price:** 8/SuperDrive, \$6539; 8/230, \$7359; 8/400, \$8169.

buy 'em



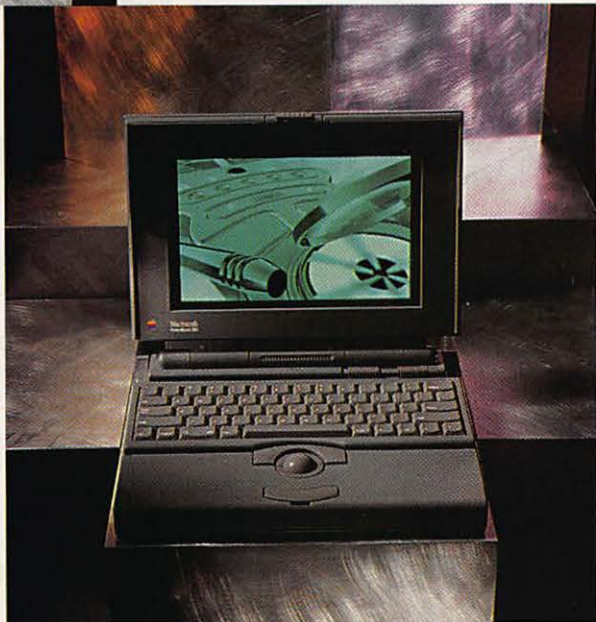
Mac PowerBook 145 The most basic PowerBook, the 145 is a solid choice for someone who wants to work at home on occasion or travels a few times a year. The black-and-white screen displays some ghosting, but it's not too bad for short-term work. The biggest drawback to this PowerBook is its lack of a video-out connector for hooking up an external monitor. **Processor:** 25MHz 68030. **Video support:** black-and-white. **Slots:** none. **Memory capacity:** 8MB. **List price:** 4/40, \$2149; 4/80, \$2499.



Mac PowerBook 160 Like the PowerBook 145, the PowerBook 160 uses a passive supertwist display and a small, light case. For \$300 more the 160 gives you two nice higher-scale features—a 4-bit gray-scale display and a video-out connector for attaching an external monitor. Even nicer, the 160 supports color—up to 256 colors on a 16-inch monitor. This PowerBook is perfectly suited to frequent travelers, executives, and anyone who can afford to pay for added flexibility. **Processor:** 25MHz 68030. **Video support:** gray-scale. **Slots:** none. **Memory capacity:** 14MB. **List price:** 4/40, \$2429; 4/80, \$2789; 4/120, \$3149.



Mac PowerBook Duo 210 and 230 These very tiny (1.4-inch thick), very lightweight (4.2-pound) PowerBooks are designed to be used with the Duo Dock, not to compete with the standard PowerBooks. The Duos cost about the same as the PowerBook 145, yet they lack a floppy drive and have only a modem port and a serial port. Other ports such as an ADB port, a video port, sound ports, and a SCSI port come on an optional attachment called the Duo MiniDock. Battery life isn't as long as with a standard PowerBook, and the keyboards and trackball are even smaller. Still, combined with the Duo Dock, these PowerBooks are a great choice for occasional road trips or for working at home. **PowerBook Duo 210.** **Processor:** 25MHz 68030. **Video support:** gray-scale. **Slots:** none. **Memory capacity:** 24MB. **List price:** 4/80, \$2249. **PowerBook Duo 230.** **Processor:** 33MHz 68030. **Video support:** gray-scale. **Slots:** none. **Memory capacity:** 24MB. **List price:** 4/80, \$2609; 4/120, \$2969.



Mac PowerBook 180 The high-end PowerBook, the 180 offers an active matrix, 4-bit gray-scale display that is additively crisp. That luxury, however, comes at a premium cost—\$1100 more than a 160. Still, executives and people who travel more than they sit at a desk may want to plunk down the extra dollars to avoid eyestrain or awkward sitting positions. If we could afford these, we'd buy 'em. **Processor:** 33MHz 68030. **Video support:** gray-scale. **Slots:** none. **Memory capacity:** 14MB. **List price:** 4/80, \$3869; 4/120, \$4229.



by Robert C. Eckhardt

FRED IS IN SHOCK. HIS HARD DRIVE, which he affectionately calls Old Reliable, lies belly-up and lifeless on a desk piled high with unmet deadlines. Because all hard drives have a finite life span and many succumb to temporary hardware and software illnesses, most Mac owners can relate to Fred. But take heart: well over 90 percent of all sick hard drives can be cured, experts say, and most can be treated easily at home or in the office, without resorting to the high-priced services of a professional drive doctor. On the following pages, I distill the wisdom of a half-dozen hard drive experts (ranging from hardware and software techies to user-group gurus) into six steps

Hard

STRONG MEDICINE

anyone can follow to diagnose a sick hard drive and, with luck, bring it back to health.

Symptoms of a Sick Drive

SICK HARD DRIVES DISPLAY SYMPTOMS BOTH blatant and subtle. The obvious problems are hard to overlook.

- The Mac does nothing but display a blinking question mark.
- The Mac initiates the start-up process and then displays the bomb dialog box or the Sad Mac icon (and possibly plays a chime as well).
- The Mac starts up properly but fails to mount the hard drive (that is, place the drive's icon along the right edge of the screen).
- The Mac states that the hard drive is not in Macintosh format or is damaged and asks if you want to initialize it. (Do *not* initialize it! If you do, you will lose all your data.)

More subtle symptoms include read or write errors when copying files, and crashes (such as

a bomb dialog box, an immovable pointer, or an unresponsive keyboard) that result from opening a folder, launching an application, or copying a file.

But before you jump to conclusions about what's causing your hard drive's trouble, note that other hardware—and even software—can produce similar problems. For example, some accelerator boards and cache cards are incompatible with System 7's 32-bit addressing mode. If you were to turn on 32-bit addressing (in the Memory control panel), the Mac would crash during start-up and the problem would look for all the world like a hard drive failure. Because you can waste a lot of time barking up the wrong

you hear the drive mechanism? (If your unit has a fan, the fan will make a steady whine almost from the moment you turn the drive on. The drive mechanism, on the other hand, will increase in pitch and volume for the first few seconds, click a few times, and then settle into a steady hum.)

If the drive mechanism produces no audible signs of life, the problem is a dead power supply, a mechanical failure, or *stiction* (computerese for an improperly lubricated drive platter; see "Stiction Defined"). You can sometimes solve a stiction problem temporarily by slapping the drive smartly on one side. But even if slapping the drive around gets it going again, a drive that

Drive Rx

FOR SICK HARD DRIVES

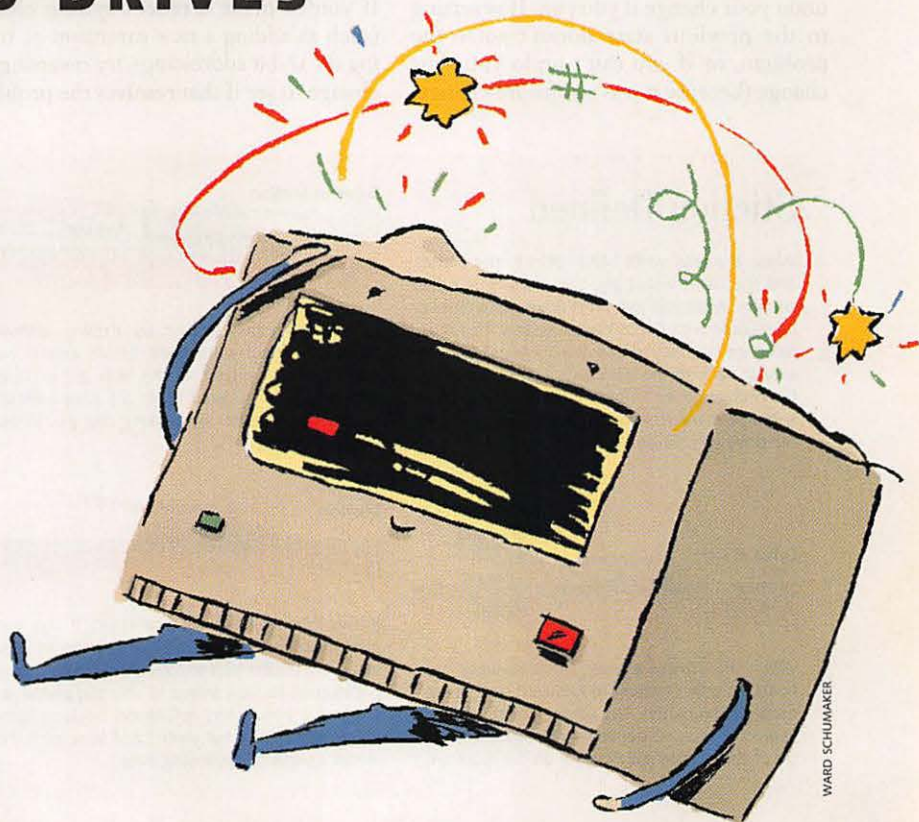
tree with nondrive problems like these, it's a good idea to strip off all your fancy hardware and revert to a plain Mac before you point an accusing finger at the hard drive.

STEP ONE:

Stay Calm and Don't Overlook the Obvious

IF YOUR DRIVE APPEARS TO BE DEAD OR DYING, take a deep breath and follow Rule 1: *Don't panic.* Next, abide by Rule 2 religiously: *Use your head and think clearly and logically.* Work through your hard drive problem in a cool, calm, and collected way. Run tests in a logical order (as outlined here, for example). Choose the next test on the basis of the previous test's results. Be sensible and rational and optimistic.

To avoid acute embarrassment, always check out the things you take for granted: Is the hard drive plugged in? Is it turned on? If the fuse is readily accessible, is it still intact? Put your ear to the drive case and switch on the drive. Can



doesn't spin up properly is seriously ill and should receive professional treatment right away. (If stiction is the problem, back up your data before giving the drive to the disk doctor, since replacing the entire drive mechanism is the only cure.)

If the drive mechanism is purring contentedly and the drive is brand-new, right out of the box, you probably need to format and initialize the drive and install the necessary system software. The drive should come with a utility for formatting and initializing and a manual to explain how. If not, you can use a program like FWB's Hard Disk Toolkit instead. Disks and instructions for installing system software either accompany the Macintosh or, for System 7 users, are available in Apple's Macintosh System Software v7 Personal Upgrade Kit.

If the drive is not brand-new and was functioning properly only a short while ago, ask yourself if you recently changed anything of consequence. For example, did you add a new device to your SCSI chain, change the order of SCSI devices, or replace or swap cables or terminators? Did you install new control panels (cdevs in System 6) or system extensions (INITs or start-up documents in System 6), or change a control-panel setting? If so, undo your change if you can. If reverting to the previous state doesn't solve the problem, or if you can't undo your last change (because it was a software change,

for example, and you can't access the drive), then it's time for Step Two.

STEP TWO:

Start Up with a Floppy Disk

TAKE A FLOPPY DISK CONTAINING A System Folder that you know is function-

If neither fix works, or if you have no idea what might have gone wrong, back up your most recent work immediately (you have a recent backup of everything else, don't you?) and go to Step Three.

If the hard drive's icon does not appear when you restart with the floppy, the

Software probably caused the hard drive's troubles if it works

ing properly and restart the Mac using that disk as the start-up disk. This simple test quickly narrows the possible sources of a drive's problems. I strongly recommend that you create an emergency floppy start-up disk *before* trouble strikes—finding or creating a start-up floppy after your hard drive dies can be truly frustrating. Symantec's Norton Utilities for Macintosh 2.0 comes with two ready-made emergency start-up disks; to create one yourself, simply make a copy of the Disk Tools or System disk (the name varies by System version) from your Mac system software package.

In general, if the hard drive mounts properly and behaves normally when you restart with a floppy disk, the source of your drive headache is probably a relatively straightforward software mishap. Check to make sure that you have only one System Folder on your start-up disk (by searching for *System* using the System 7 Finder's Find command, for example). If you've made a recent system change (such as adding a new extension or turning on 32-bit addressing), try reversing the change to see if that resolves the problem.

difficulty is likely to be a more complex software problem or a hardware problem. Remain calm, keep your fingers crossed, and proceed to Step Four.

STEP THREE:

Root Out Corruption and Conflicts

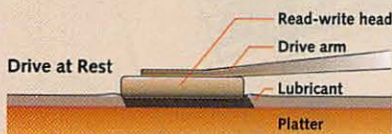
CORRUPTED SYSTEM SOFTWARE AND conflicts among extensions and control panels are two of the most common sources of hard drive illness. The first step in rooting out these problems is to prevent all nonessential extensions and control panels from loading and see what happens. System 7 users can do so simply by restarting with the hard drive as the start-up disk and holding down the shift key during the start-up process. System 6 users will need to move all cdevs and start-up documents out of the System Folder (to find them quickly, list the contents of the System Folder window by kind) and then restart with the hard drive as the start-up disk. If the drive now works, you've either got one or more corrupted extensions or control panels, or a conflict between two or more of them.

Because there's no easy way to determine if a file is corrupted, the safest course is to remove all old extensions and control panels (if you've haven't done so already) and install all new files from the master disks. If the drive still doesn't work, then maybe the problem is a conflict between system resources. To check for conflicts, remove all non-Apple system resources. Then reinstall and work briefly with one file at a time, or use an extension manager like Inline Design's INITPicker or On Cue II's On Startup (from Icom Simulations), both of which can automatically disable the source of an extension or control-panel conflict.

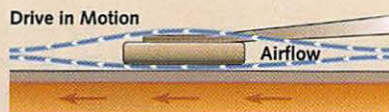
If extensions and control panels aren't your problem, replace the System file and Finder. First back up the fonts and sounds (in System 7) or fonts and desk accessories (in System 6) residing in the to-be-replaced System file. (In System 7, double-click on the System file to open it and copy the sounds and fonts by hand; in System 6, use Font/DA Mover to copy fonts and desk accessories to two new suitcase

Stiction Defined

When the read-write head sticks to the platter, and the drive won't go, the problem is called *stiction*. Most modern hard drives have little or no trouble with stiction because their heads are designed so they don't have enough surface area to stick to the lubricant on the platter. But the problem does crop up in older drives. There is no permanent solution other than replacing the drive mechanism.



When the drive is at rest, the read-write head floats on a thin coating of lubricant so it doesn't damage the platter. (At power-off, the head is *parked*; it rests on unused sectors near the center of the platter, still floating on the lubricant.)



As the drive spins (shown by arrows), airflow causes the read-write head to lift above the platter; this is similar to the way an airplane wing works. (The head reads the data without touching the platter by sensing changes in the magnetic field.)



If the lubricant has contaminants, it can get gummy and cause the read-write head to stick when the platter tries to spin. (The drive's motor is designed to stop trying to spin the platter as soon as it encounters resistance, because forcing it might cause the stuck head to scratch the platter's surface, destroying data.)

files, one for fonts and one for desk accessories.) Next, restart with the System Software Installer (System 7) or System Tools (System 6) disk as the start-up disk, open the System Folder on the hard drive, throw the old System and Finder files in the Trash (that's right, throw them in the

drive and the Mac—using the Update Driver (or similar) command in the utility provided by your hard drive's manufacturer or using a generic drive utility such as Hard Disk Toolkit.

If updating the driver doesn't work, reset the Mac's Parameter RAM (PRAM). PRAM is where many basic control-panel settings, such as the time, date, start-up disk, and AppleTalk status, are stored. If you're using System 7, reset PRAM by restarting the Mac and pressing option-control-P-R during the start-up sequence. System 6 users should hold down ⌘-option-shift as they select the Control Panel from the Apple menu. Once PRAM is reset, open the Startup Disk control panel, select the problem hard drive, and restart the Mac. (You'll also need to reenter all your basic control-panel settings.)

If you've had no success so far, or if the drive now starts up properly but some folders and files are missing, blank docu-

ment icons appear instead of the correct application icons, or the system crashes when you try to open files or folders, it's time to turn to Disk First Aid. You'll find this often-ignored but surprisingly helpful utility on the Disk Tools (System 7) or Macintosh Utilities (System 6) disk in your Mac's system software package. Use a copy of that disk as the start-up disk, launch Disk First Aid, select the problem hard drive, and click on the Open and Start buttons. (To see a running commentary on what the program is doing, press ⌘-S immediately after clicking on the Start button.) If Disk First Aid reports and repairs any problems, restart and see if the drive now runs properly.

If your drive still gives you problems, you've got one final trick up your sleeve: Rebuilding or replacing the drive's Desktop files. (Desktop files, invisible under ordinary conditions, store important information about the files on your hard drive.) For a "lite" Desktop file rehabilitation, press ⌘-option during the start-up sequence and answer OK when asked if you want to rebuild the Desktop files. To get the full treatment and a better shot at solving a tough problem, use a utility that can see invisible files, such as CE Software's DiskTop or Central Point Software's MacTools 2.0, to locate and move the Desktop files into any folder. When you restart the Mac, it will automatically create a completely new set of Desktop files.

If any technique in this step successfully revives the drive, *always* check for viruses. A hard drive brought down by a virus infection will have repeated relapses unless you eliminate the source of the infection. Simply treating the immediate problem (a corrupted file, say) is insufficient. Use a full-strength, up-to-date antivirus program such as Symantec's SAM, Microcom's Virex, or John Norstad's free and widely distributed Disinfectant to diagnose and cure a viral infection.

If the techniques in this step don't revive the drive, go to Step Five.

STEP FOUR:

Make the Right Connections

IF THE FLOPPY-DISK START-UP TEST fails, the next step is to determine whether the problem is within the drive itself or elsewhere. ("SCSI Do's and Don'ts" shows where troubles might lie.) To determine if the source of your grief is elsewhere—in your Macintosh system unit or in the SCSI chain, of which the hard drive is a part—run the hard drive all by itself from a different Macintosh using a SCSI cable and terminator that are known to be functioning properly. (If the test Macintosh has an internal hard drive,

when you restart with a floppy

Trash), and empty the Trash. Then install all-new system software.

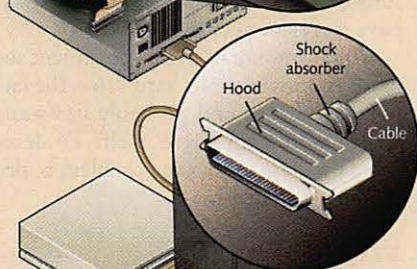
If this does the trick, you'll probably want to install new fonts, sounds, and desk accessories from the master disks, since one or more of them may be corrupted.

Still no luck in getting the Mac to start from the hard drive? Try replacing the hard drive's driver—the software that facilitates communication between the

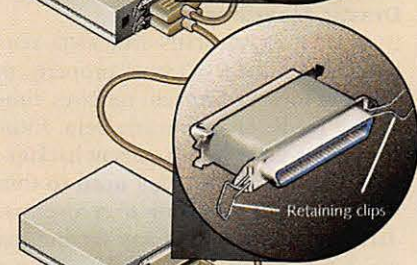
SCSI Do's and Don'ts



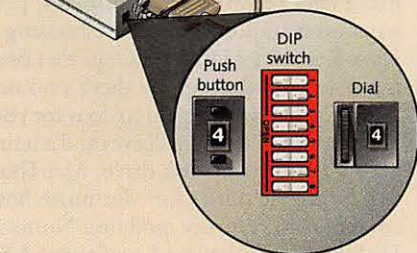
Internal Cable Don't crimp the flat-ribbon SCSI cable connecting the internal hard drive to the Mac. You can bend and fold the cable as long as you don't flatten folded areas. If you crimp the cable, you may break one of the wires, which could cause the drive to stop working. (If you do break a wire, replace the cable.)



External Cables Buy quality SCSI cables. Look for a shock absorber around the part of the cable that comes out of the hood; this minimizes the risk of breaking a wire when you pull on the hood or cable. Solid, hefty construction is a plus. A cheap cable hood, whether molded or held together by screws, can be misaligned or crack open easily.



Termination Connector Terminate the first and last device in your chain. The first device is usually the internal hard drive, which is already internally terminated. The last device should have an external termination connector, either between the SCSI cable and the drive's SCSI port or on a free SCSI port (for drives that have multiple SCSI ports). Make sure your last device is turned on—if not, no devices on the chain will work.



SCSI Addresses Set your peripheral's SCSI address to a number not used elsewhere in the chain. Your internal hard drive is set at 0, so don't use that number for any other device. There are several mechanisms used to set SCSI IDs; they all perform the same task. Three popular mechanisms are push buttons, DIP switches, and dials. Verify SCSI ID settings by using a program like FWB's Hard Disk Toolkit or Golden Triangle's DiskMaker.

make sure it is protected from viral infection.) If another Mac is not available, disconnect all other SCSI devices and try the problem drive with several different cables and terminators (in case one or more have gone bad). If the problem drive runs OK in isolation or on another Mac, the difficulty is external to the drive.

You can rule out the Mac system unit by borrowing someone else's hard drive, with its cable and terminator, and running it by itself on your Mac. If the borrowed drive does not work properly, your Macintosh system unit is probably at fault and should be taken in for repair. If the borrowed drive does work properly, the difficulty must lie somewhere along the SCSI chain: you've got cable problems, a bad terminator, an incorrectly located terminator, a SCSI ID number conflict, a bad connection, or a finicky SCSI device.

SCSI chain geometry is often arcane, so sometimes only a Mac guru can resolve a SCSI hang-up. But there are some SCSI problems the rest of us can correct.

First, check carefully to make sure that the SCSI chain is linked together properly and all connectors are tightly fastened. Use good-quality cables that are as short as your office configuration allows. Quality SCSI cables have molded ends and are well shielded and thus fairly thick and unyielding. It's best to use the same kind of cable for all your SCSI devices (you know what they say about one weak link in a chain) and to keep the total length of cable as short as possible (never more than 18 feet). Since a dead SCSI cable looks just like a live one, you need to experiment one cable at a time to see if one's gone bad. If you have a modular Mac with an internal drive, you should also open the system unit to make sure the internal SCSI cable (the wide, flat one) isn't crimped or pinched.

Second, be sure all devices on a SCSI chain have a unique ID number. The Mac itself is always assigned ID 7, and the internal drive (if you have one) should be assigned ID 0 (zero) by the vendor. External SCSI devices must be assigned a number from 1 to 6 (or 0 to 6 if you have no internal drive), usually with a dial or push button on the back of each unit. To ensure that the internal drive is indeed assigned ID 0, and to confirm that the other devices are numbered as expected (sometimes the number displayed by the dial or push button on the external drive is incor-

rect), use a program like Robert Polic's SCSI Probe, Norton Utilities, or Hard Disk Toolkit to read the ID numbers actually in use (see "Tracking SCSI IDs"). The formatting software that comes with the drive may also tell you this.

Third, check termination. The general rule is to place a terminator at both

terminator mounted on the logic board; the only way to know it's there is to open the Mac and look inside. Many older (and some newer) external drives have a terminator built in; there's no way to tell which do and which don't except by reading the manual. And although they look like functional terminators, accidentally shorted

SCSI chain geometry is often arcane, but there are some SCSI

the beginning and the end of the SCSI chain; Macs with internal drives already have an internal terminator and thus need to be terminated only at the far end of the chain (see "Internal Termination").

SCSI rules, however, were apparently made to be broken. The Mac IIx requires a special terminator, for example, and all PowerBooks require two terminators (one on the first external device and one on the last external device), even though they have a terminated internal drive. To make things worse, some Macs lacking an internal drive nonetheless have an internal ter-

(and thus dead) terminators are equivalent to no terminator at all. Faced with such complexities, your best bet is to treat terminators with care (and suspicion) and carefully follow the termination scheme recommended in your Mac's manual.

Finally, as if things weren't bad enough already, SCSI devices themselves can be finicky about whether or not they're turned on and where they link into the chain. In theory, you should be able to place SCSI devices in any order in a chain and leave any SCSI device turned off. In practice, some SCSI devices can bring the entire chain down if they're turned off; if a SCSI device is turned off and you are experiencing problems, try turning that device on. In addition, certain devices, such as many scanners and tape drives, can create problems unless they're placed at the end of the chain. Two touchy SCSI devices may not be able to coexist peacefully on the same chain; to use one, you'll have to disconnect the other.

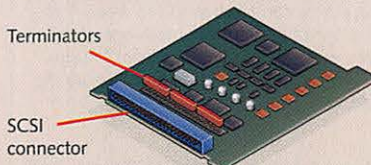
If no amount of SCSI adjustment succeeds in reviving your hard drive, the fault is fairly serious and probably lies somewhere within the drive itself. To determine just how serious the problem is, proceed to Step Five.

STEP FIVE: Drastic Measures

IF YOU'VE COME THIS FAR AND YOUR hard drive still doesn't work properly, the solution to your problem requires either strong medicine or outside help. Either way, if you don't have a current backup of your important files, you need to think carefully about if and how to recover your data, since proceeding any further may make data recovery more difficult, perhaps even impossible (see "Choosing a Data-Recovery Method"). Once that issue is resolved, and assuming there's no one down the hall who is paid to do it for you, it's time to roll up your sleeves and administer CPR to your disk drive. MacTools and Norton Utilities for Macintosh both contain disk-recovery modules; Norton's Disk Doctor is the one I recommend for the full treatment.

S

Internal Termination



The first device in a SCSI chain must be terminated. An internal hard drive is—by default—the first device. Unlike terminators for other SCSI devices, the terminators for an internal drive are located on the Mac's logic board, behind the SCSI connector. If you're having trouble chaining SCSI devices, make sure the internal terminators are installed on the logic board.

SCSIProbe 3.2				
SCSIProbe 3.2				
ID	Type	Vendor	Product	Version
0				
1	DISK	MAXTOR	XT-8380S	AP9
2	DISK	SyQuest	SQ555	FFH
3	ROM	SONY	CD-ROM CDU-8001	3.2i
4				
5	CPU	HP	C1750A	3125
6				
7	CPU	APPLE	MACINTOSH IIx	\$0178
<div>Update Mount Options...</div>				

Tracking SCSI IDs SCSI Probe can tell you which SCSI IDs are being used and, if you're versed in techie shorthand, the types of devices to which they're assigned. Here, for example, a standard hard drive, a removable hard drive, a CD ROM drive, and a scanner are attached to a Mac IIx.

Using your start-up floppy as the start-up disk, launch your disk-recovery program and ask it to diagnose and repair the problem drive. If it reports and repairs only a few problems and the drive appears cured, you can use the drive as is—if you're careful and back up your work religiously. But the wisest course is to back

If your disk-recovery program reports a lot of problems and repairs them, don't tempt fate; once again, it is safest to back up everything, reformat the drive, and install new system software. Do the same if your disk-recovery program reports problems that it can't fix or if it finds *bad sectors* (or *bad media* or *bad blocks*)—whether or not it claims to be able to fix them. (Bad sectors are areas on the disk that can no longer store data reliably.) Fixing bad sectors by “marking them off” or “zeroing them out”—telling the Mac not to read or write to them—is a common and reasonable short-term fix (to give you time to meet tomorrow's deadline and then back everything up). But hard drive experts all agree that reformatting the drive is the only proper remedy for bad sectors.

If your disk-recovery program cannot repair the drive but your hard drive utility or the Mac's Hard Disk Toolkit can recognize the drive (and the critical data on it is already backed up), then reformat the drive and install new system software and see if that eliminates the problem. If none of your drive utilities or repair utilities acknowledge that the drive exists or if reformatting the drive doesn't clear up the problem, proceed to Step Six.

STEP SIX: Last Resort

SAD TO SAY, BUT THERE'S NOT MUCH left that mere mortals can do. A call to the drive manufacturer's technical-support line may be worthwhile; describe all the tests you've done and repairs you've made and see if they have any other recommendations. You might also check with your local user group. Many groups have regularly scheduled drive clinics, and although such clinics are not likely to perform tests much more sophisticated than those outlined here, they may use utilities that will succeed where yours has not. If these tests, too, fail to produce results, it's time to send the drive out for repair.

Famous Last Words

THE OLD SAW ABOUT AN OUNCE OF prevention being worth a pound of cure is certainly true for hard drives. You'll have fewer headaches if you treat your drive, cables, and terminators with care, install a full-strength antivirus utility that prevents infection, and add new files to your System Folder cautiously.

Many Mac gurus also suggest that you reinstall the Mac system software and update the hard drive driver every few months and rebuild the Desktop files every month or so. An occasional scan with Apple's Disk First Aid or Norton Utilities' Disk Doctor also can't hurt and could catch and repair small problems before they become big disasters. (If you own Norton Utilities, installing FileSaver and creating the Volume Information File for your hard drive—and storing a backup of it—are also good medicine.)

And, of course, back up your important data constantly. If you play your cards right, you should rarely, if ever, need to use the drastic measures outlined in Steps Five and Six. If you play your cards well, you may never get to Step One. **m**

See *Where to Buy* for contact information.

ROBERT C. ECKHARDT, a *Macworld* contributing editor, is coauthor of *Desktop Publishing Secrets* (Peachpit Press, 1992). His hard drive has a Do Not Resuscitate notice on it, since it is frail and exhausted from nearly five years of hard labor.

problems most people can solve

up everything, reformat the drive (to wipe the slate clean), install all new system software, and restore your applications and files. (Think of it as a chance to reorganize your files the way you want them.)

Choosing a Data-Recovery Method

I've never met anyone whose hard drive died five minutes after the last complete backup. In the real world, most hard drive problems occur at especially inconvenient times—days, weeks, or (heaven forbid) months after the last backup. If you can't revive the drive by following the steps outlined in the main text, or if your revived drive has corrupted files, most likely you need some way to recover lost data.

There are two basic recovery methods to consider: using a data-recovery program or hiring a data-recovery service. The decision boils down to this: how much are your lost files worth to you? How much, in other words, would it cost you to reconstruct the files you really need? If your lost files are priceless (or at least very expensive to replace), you should seriously consider abstaining from Steps Five and Six in the main text (and perhaps even Step Three) and sending your drive to a data-recovery specialist.

According to Scott Gaidano of DriveSavers, a Mac-only national data-recovery service based in Novato, California, messing around with the drive's software may make data recovery even more difficult should your well-meaning (but possibly harmful) attempts fail. Also, if your sick hard drive is a large-capacity drive or a file server with over 10,000 files stored on it, don't even think about resurrecting the data yourself—the chances of causing major damage are too high. Check with DriveSavers, or contact your drive manufacturer or a local user group for the names of data-recovery specialists in your area.

At the opposite end of the scale, if only a few hours' worth of data is lost (and your time is worth something less than a princely sum), then passing up the expensive data-recovery specialist is relatively easy. Because you have little to lose if you fail, trying to recover the data yourself involves little risk. Any of three programs can help in your recovery attempts.

- **Symantec's Norton Utilities for Macintosh, version 2.0**, combines and replaces the old Norton Utilities and SUM (Symantec Utilities for the Mac) and leads the field in automated disk repair and data recovery—it was the top choice of all the experts surveyed because of its broad set of tools and proven track record.

- **Central Point Software's MacTools 2.0**, the Swiss Army Knife of disk utilities, contains competent data-recovery and disk-repair modules. It is a second choice to Norton.

- **Microcom's Utilities** demands more attention and input from the user than the other two (fortunately, the manual provides all the essential information). But it's your best bet for retrieving the text in files corrupted beyond repair.

Most of us are likely to own only one of these programs, but if you have access to several, keep in mind that one recovery program (including the now-discontinued SUM) may well succeed—for no obvious reason—where another has failed.

Of course, it's that gray zone between priceless data and little to lose where the hard choices lie. To decide between a data-recovery specialist and a do-it-yourself job, make a hard-nosed assessment of what it would really cost to reconstruct everything worth reconstructing. Then compare that with the price of a recovery program (plus the value of the time it takes to use it) and \$300 to \$600 (or more, for drives over 150MB) for a recovery specialist.

The more valuable your lost data is, the more appealing the data-recovery specialist becomes—and the more likely you are to perform regular, even daily, backups in the future.



Safe bets: From top to bottom, the Optima Technology MiniPak 150T, the Procom Technology PMT600/M, and the Dynatek DAT 4000.

A RICH HARVEST OF TAPE DRIVES
MEANS REASONABLE PRICES AND
CLEAR CHOICES

Tape Backup Bounty

There are two kinds of computer users: those who *have* lost their data to a hard drive crash or other problem, and those who *will* lose their data. If you're in the first group, chances are you've learned from the experience and are now backing up your hard drive. If you're in the second group, consider this: a recent backup can mean the difference between an inconvenience and a disaster.

Here's a case in point. During the Los Angeles riots earlier this year, many businesses were robbed; some were burned to the ground. After the violence, one of my clients called and told me that his athletic-clothing company's offices had been looted to the walls. All of his inventory, his entire network of Macs, and worst of all, his AppleShare file server had been stolen. But because he had a current backup of all of his operational data on a tape cartridge, he was able to get his business back up and running as quickly as he (and his insurance company) could purchase new equipment. Less than two weeks after the theft, my client was entering orders, printing invoices, and shipping sweatshirts again—all because he had the foresight and discipline to back up to tape.

Tape drives, like hard drives, are more alike than they are different, so after you decide which tape format to use, price should come to the fore of your buying criteria. To measure the value of a particular tape drive, figure the drive's price per megabyte of storage. You should also consider the backup capacity you require, the backup software that comes with the drive, and whether you want to use the drive to back up more than one Macintosh. In order to make those decisions, consider the various tape formats. In this year's roundup, we look at drives using five formats—DC2000, DC6000, Teac, DAT, and 8mm helical.

by Tom Negrino

Quarter-Inch Drives

THE QUARTER-INCH-CARTRIDGE (QIC) DRIVES were the first tape-backup units for the Macintosh. To record data these drives use .25-inch-wide magnetic tape encased in a hard plastic shell with a machined aluminum baseplate. This rugged construction makes for precise head alignment—the read-write tape heads are always positioned correctly over the tape—and good reliability, but adds to the cost of the cartridges.

TAPE DRIVES, LIKE HARD DRIVES, ARE MORE ALIKE THAN THEY ARE DIFFERENT

The QIC family consists of two lines. The DC2000 line is appropriate for personal backup, holding between 40MB and 120MB, depending on tape length and the formatting scheme used. The DC6000 line, for large amounts of data, has capacities from 150MB up to 2GB.

While still very popular for IBM-compatible computers, DC2000 drives suffer from a variety of drawbacks that have led to their decline in the Mac market. Current models are limited to low (120MB) capacity; they're noisy in operation; they have the slowest mechanisms of all the tape drives we tested; and they are almost twice as expensive to operate as any of the other drives on the market, with tapes costing about 25 cents per megabyte. Because of these negative attributes, I don't recommend a DC2000 drive. This year, only two manufacturers listed a DC2000 unit, and we only received one for testing, a new Teac unit by Tulin Corporation.

The Apple Tape Backup 40SC, which has recently been discontinued, was a DC2000 drive that had a capacity of 38MB. A fair number of these drives are still in use, despite being slower than vir-

tually all other tape drives available. One way to cut backup times with the Apple drive in half is to discard Apple's backup software and use Dantz Development's Retrospect instead.

The other kind of QIC drive, the DC6000 format, is much healthier in the Mac market than its smaller cousin. The DC6000 cartridges are larger than their DC2000 counterparts, and hold much more data. There are four types of DC6000 drives available. The 150MB unit can hold 250MB with an extended-length tape. The midrange unit has a capacity of 320MB, and 525MB with the extended-length tape. This is an especially quick drive, turning in very good backup times in our lab testing. The 1GB drive uses a new tape formulation that can pack data more densely and is even faster than the 525MB drive. The newest addition to the DC6000 family is the 2GB unit, which shipped after our deadline for product testing.

Because there are faster and less-expensive choices in other tape formats, notably the Teac 600MB drives, I can't recommend the 250MB DC6000 drives. Good 525MB drives come from Novastor Corporation, FWB, DynaTek Automation Systems, and Sankyo. The 1GB units we tested from Sankyo and Tandberg Data were quite fast.

If you must back up a lot of data, the drawback of the DC6000 format is not speed or reliability, it is price and capacity. While 1GB and 2GB units are available, they are much more expensive than a DAT unit. The least-expensive 1GB DC6000 drive, the \$1695 Sankyo MT-1000RF, costs about \$400 more than the least-expensive DAT drive (the \$1298 MacDirect NuDesign DAT), and the DAT unit holds about 300MB more data. With built-in data compression, available in DAT but not yet in DC6000, the price-to-capacity gulf between the two formats is even wider.

Some people prefer DC6000 because the format

Better Compression, Higher Capacities Coming

When you're investing in a backup device, make sure that the device will be around for a reasonable amount of time before it inevitably succumbs to the rapid evolution in storage devices.

Although DC2000 drives have been fading as a force in the Mac backup market for the past few years, some new drives show that there's still life left in the format. Teac is currently shipping a 150MB unit; Irwin has a 320MB drive that should be shipping by the time you read this; and a 500MB drive is expected from Everex around the end of the year. Prices for all these drives should be well under \$1000. The combination of low price and medium capacity will place them in direct competition with the Teac data-

cassette units for personal backup.

DC6000 manufacturers have a 2GB drive that should be delivered late this year. The Quarter Inch standards committee is in the last stages of finalizing the 2GB DC6000 standard. But considering the proliferation of low-cost DAT drives, and the relatively high cost (about \$2000) of the high-capacity DC6000 units, it's unlikely that the 2GB DC6000 will make much of an impact in the Mac market.

Helical drive manufacturers are still riding the ascending side of the development curve. Exabyte will be delivering its 8500C mechanism by the time you read this; this will finally bring hardware data compression to the 8mm format. The 8500C adds a compression chip to

the existing 5GB drive, boosting capacity to as much as 10GB. In the next few years, the 8mm format is expected to reach capacities as high as 25GB to 30GB.

The future of DAT is just as bright. Current models hold up to 2GB of data on a 90m tape, and they can further increase capacities via data compression. In 1993, Sony and Hewlett-Packard plan to release units that will use 120m tape, thinner data tracks, and higher-energy media to hold 4GB; data compression will give a practical capacity of 5GB or 6GB. Plans are afoot to double DAT backup capacity every two years after 1993. That schedule may be unrealistically optimistic, but we should see 16GB DAT drives by 1997.

has a long history, and because they believe that DC6000 cartridges are built more solidly than DAT tapes and will be more reliable. But drive manufacturers say that DAT and DC6000 show equivalent failure rates, including both drive mechanisms and cartridges, and that those rates are very low. So unless the cost of DC6000 drives drops, it appears that DAT drives will continue to be a superior choice from the cost viewpoint.

Teac Drives

THERE ARE THREE TEAC DATA CASSETTE DRIVES, holding 60MB, 150MB, and 600MB. Each mechanism uses a different kind of cassette, and the larger-capacity models can read, but not write to, the lower-capacity formats.

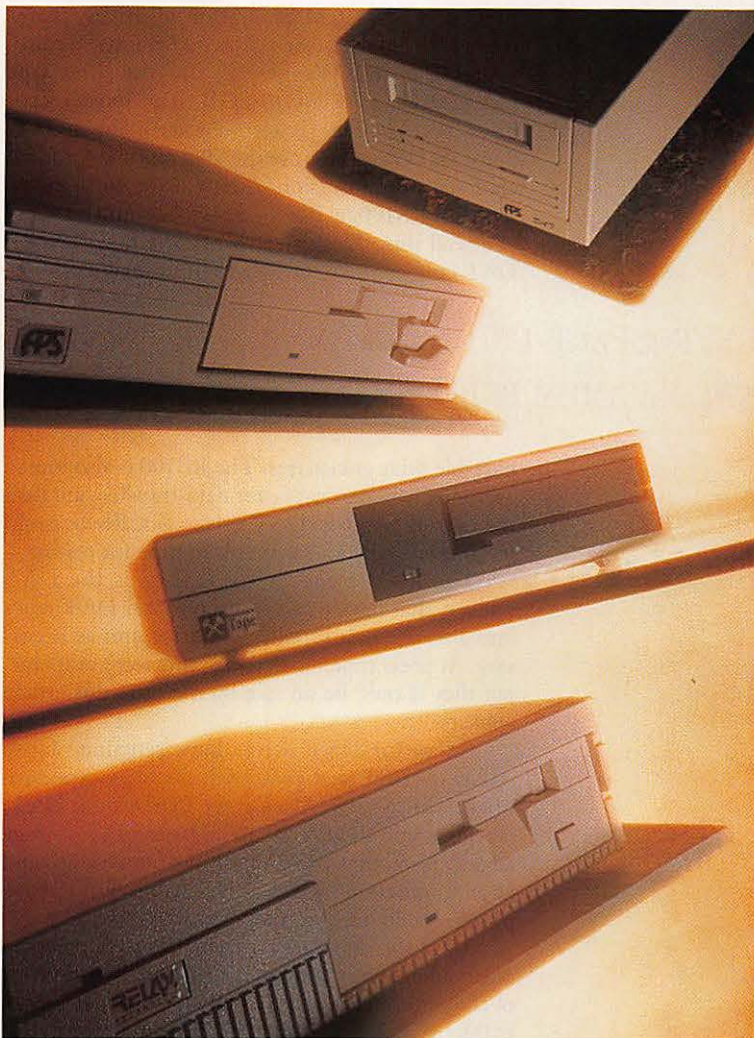
The 60MB drive has lost popularity among most manufacturers and has been mostly supplanted for personal backup by the faster 150MB drive. We could find only two vendors that still offer the 60MB drive: CMS Enhancements and Maynard Electronics. Given that you can buy a Teac 150 drive for less than the least-expensive 60MB unit, there's no good reason to buy a 60MB Teac drive anymore.

A Teac 150MB drive is the best entry point for people who have light backup needs. First of all, the drives are inexpensive; the APS Teac 155 from APS, priced at \$499, was the least-costly tape drive we tested. This capacity is a good match for the majority of individual users, whose hard drives rarely exceed 100MB. And the Teac 150 mechanism performed well in our speed tests. Drives based on the Teac 150 are fairly quiet in operation, unlike the noisy QIC drives. Teac 150 drives also enjoy glowing reliability reports. Tapes cost about \$25, which breaks down to about 17 cents per megabyte of storage. Many manufacturers offer Teac 150MB drives, so price and technical support should be your prime buying considerations.

The highest-capacity version of the Teac mechanism holds 600MB. At street prices of well under \$1000, the Teac 600 drive is a good backup choice for individual users with large files, such as graphic artists and desktop publishers. This drive is also well suited to backing up small networks with a file server and a few workstations. The Teac 600 drive is 25 percent faster than the 150MB version. In our speed tests, Teac 600 drives as a group were almost as fast as the DAT units in raw backup speeds, but the DAT drives were superior in finding and retrieving a small number of files from the backup tape.

Helical Drives

IF YOU WANT TO BACK UP A VERY LARGE AMOUNT of data, such as a giant file server or all the hard drives attached to a network, you need a drive that combines huge capacity with relatively fast performance. Helical drives fit the bill. They're called helical because the tape wraps around a drum with spinning read-write heads that trace a diagonal path across the tape. There are two main types of helical drives, 8 millimeter and DAT (digital audiotape). Both are based on tape formats designed for the audio or video markets; 8mm tape was originally designed for camcorders, and DAT mechanisms found their start in digital audiotape recorders. Both 8mm and DAT



The best drives in this year's tape roundup, combining performance and affordability, are (from top to bottom) the APS Compression DAT, the APS Teac 155, FWB's hammerTape 525, and the Vista 600 Tape from Relax Technology.

backup drives have been extensively modified from their origins, however, so you won't be able to use your camcorder for backup. Data backup requires higher reliability than video or audio reproduction, so helical backup drives use error-correction circuitry and higher-quality tape transports than their consumer brethren.

DAT tapes come in two lengths, 60 meters and 90m. Without using data compression, 60m tapes hold 1.3GB of data, and 90m tapes have a capacity of 2GB. DAT drives that incorporate a chip that compresses the data as it is being written to the tape are able to fit more data on a given tape, and these were the fastest of all of the drives we tested. Some manufacturers claim that compression allows them to squeeze as much as 8GB on a 90m tape. While such capacities are theoretically possible, a more realistic figure is between 3GB and 4GB, depending on the kinds of files being compressed. Applications tend to compress poorly, as do sound and font files. Best for compression are text, word processing, and bit-mapped graphics files.

DAT mechanisms are made by several manufacturers but fall into a few types. There are the 1.3GB units, such as the WangDAT 1300 and the Archive

Python. The second generation of drives, represented by mechanisms from Hewlett-Packard, WangTek, and WangDAT, use the 90m tape length, for a capacity of 2GB. The most recent drives, by Archive, Hewlett-Packard, WangDAT, Sony, and WangTek, use the 90m tapes and also include data compression. A new drive mechanism, the 2GB RB100 by Rbyte, should be shipping when you read this. This drive will be the first 3.5-inch DAT unit, so it will be able to fit in smaller, more-

RETROSPECT USUALLY MANAGES TO SQUEEZE THE MAXIMUM PERFORMANCE OUT OF A DRIVE

portable drive enclosures. The RB100 is also touted as having a 30 percent faster data-transfer rate than the current array of DAT drives, but Rbyte could not provide a production unit in time for testing.

The latest trend in DAT units is the DAT stacker; that device can load up to ten DAT tapes into a feeder that supplies the drive unit as necessary. At press time, no stacker units were available, but they should be on sale by the time this article appears.

Prices for DAT drives have remained fairly steady over the past year, with the least-expensive drive, the \$1298 MacDirect NuDesign DAT, creeping only about \$100 under last year's low-price leader. Now that production has ramped up, and large numbers of drives are available, DAT drive prices should decline, albeit slowly.

All of the 8mm drive mechanisms are made by one manufacturer, Exabyte. There are two versions of the 8mm drive, the model 8200 and the model 8500, holding 2.2GB and 5GB, respectively. Because all of the drive mechanisms are the same, your choice of an 8mm drive should be based on price, service, and which manufacturer's software makes the mechanism perform best.

In Macworld Lab testing, the fastest 8mm drive was the MacinStor T5000, a 5GB unit by Storage Dimensions, which uses Retrospect. This is where price comes in; the Storage Dimensions drive lists for \$6460; the other 5GB 8mm drives that provide the same software sell for as little as \$3299. The 8mm drive format currently leads the tape-drive industry in capacity, and is expected to maintain that lead as technologies improve and capacities in all formats increase.

DAT and 8mm tapes are the least-expensive tape media you can buy, either from an absolute standpoint (street prices range from \$13 to \$40) or from a price-per-megabyte standpoint (less than a penny per megabyte). One tip you should remember when buying DAT tape, however: make sure that you get data-grade DAT cartridges. They'll have "DDS" or "Digital Data Storage" stamped on them. While audio-grade tapes will work in your drive, they're less reliable than data-grade tapes, which are verified and certified to have fewer *drop-outs*—unreadable spots on the tape—and other media errors. Data-grade DAT tapes cost a few dollars more, but the extra security is well worth the small additional cost.

Software

AFTER CHOOSING A TAPE FORMAT AND DRIVE mechanism, consider the linchpin of these drives—backup software. Most people regard backing up a hard drive with the same enthusiasm that they view a trip to the dentist; if you look for software that makes backup relatively painless, you'll back up more often.

The dominant backup program is Dantz Development's Retrospect, bundled with the majority of tape drives sold. Retrospect owes its popularity to its completeness; it offers, by far, more features than any other backup program. Retrospect works with virtually every tape mechanism, as well as SyQuest cartridges, floppy disks, and magneto-optical drives. And Retrospect usually manages to squeeze the maximum performance out of a given drive.

Most other backup programs read a block of data from the hard drive, then write it to the tape, then go back to the hard drive for more data. The tape drive has to stop and reposition the tape so that it writes the data onto the tape contiguously. Retrospect uses a technique called SCSI disconnect-reselect, which maximizes speed by enabling the Mac to fetch data from the hard drive as it simultaneously writes data it has received to tape. The tape drive's speed at writing data, not the Macintosh's SCSI port, is therefore the bottleneck. (The method is so successful that Apple has promised to include it in a future revision of system software.) With the exception of FWB, every type of drive we tested was faster using Retrospect than the same mechanism tested with other software. Retrospect's file-selection features offer the most flexible criteria for backup or restore; for example, you can specify all PageMaker files older than three months that have names containing the word *brochure*. You can string together several search criteria using logical operators such as AND and OR to make complex selections. Alternately, you can use one of the program's Selectors, such as Only Documents, or Modified in the last week. Retrospect also provides easy scheduling for automatic, unattended backup.

Retrospect's advanced features can be confusing to use, however. Dantz is working on this problem in Retrospect 2.0, which should ship around the time this article appears.

To back up file servers and workstations over a network, Dantz has Retrospect Remote. This software lets each client choose which files and folders on his or her hard drive will be backed up, or if the drive will be backed up at all. The Retrospect Remote package includes the standard Retrospect program. Some manufacturers bundle the single-user version of Retrospect; others include a three-user pack of Retrospect Remote. Dantz sells five- and ten-user packs of Retrospect Remote software.

Some manufacturers prefer to write their own software. Tecmar bundles the excellent QT Backup with its drives. I like this software because it has two interface modes. For beginners there is an icon-driven interface that walks you through the backup process. For advanced users, QT Backup provides a complete file-selection capability, automatic backups, and the easiest network-backup software available. FWB provides its own software, as well as Retrospect, with its tape drives. The FWB software was faster

Tape Drive Times

All times are in seconds.

Drives over 500MB

Color Key

Fastest

Percent slower than fastest

Up to 10%

11%–20%

21%–29%

30% or more

The drives are listed from best overall performance (top) to worst overall performance (bottom) in each capacity range, based on backup, retrieve, and restore application tests. To determine rankings, we indexed overall performance numbers against the fastest drives in each category—the FWB hammerDAT 5000 and the APS Teac 155, which received 1.00 index scores, listed to the left of each product. Performance among the top several small drives was, for practical purposes, identical. Only when the index number is calculated to three or more decimal places do differences become visible; so the top four drives all received 1.00 index scores.

NA = Verification not offered by software supplied with drive.

Mechanism codes are in parentheses following product names.

A = Archive; E = Exabyte;
HP = Hewlett-Packard; R = Rbyte;
SA = Sankyo; SO = Sony; T = Teac;
TB = Tandberg; TT = Transitional
Technology; WD = WangDAT;
WT = WangTek.

Overall Fastest	1.00	FWB hammerDAT 5000 (WD)(using FWB software)
	0.96	APS Compression DAT (A)
	0.96	DynaTek DAT 4.0 (HP)
	0.93	Tecmar QT-525 (WT)
	0.92	FWB hammerDAT 5000 (WD)(using Retrospect)
	0.92	Storage Dimensions MacinStor T5000 (E)
	0.89	Memory Bank Memorytype MT30 (A)
	0.85	CMS Enhancements Platinum DAT 2600 (WD)
	0.83	Legacy Storage Systems 2000S (E)
	0.82	Relax Technology Vista 2.0 GB DAT (A)
	0.79	FWB hammerTape 525 (WT)
	0.79	Transitional Technology CTS-4 (TT)
	0.79	Tandberg Data Panther 1000 (TB)
	0.76	DynaTek QIC 525 (TB)
	0.76	Liberty Systems Liberty 70 DAT (A)
	0.75	APS DAT (A)
	0.75	La Cie Cirrus DAT (A)
	0.75	Hewlett-Packard 35470A (HP)
	0.75	Micronet Technology Micro/Tape CPKD-2000 (A)
	0.75	DynaTek DAT 2.0 (HP)
	0.75	Storage Dimensions MacinStor T2000 (HP)
	0.75	Micronet Technology Micro/Tape CPKT-600 (T)
	0.75	SunStor Systems Sun MT-525SC (SA)
	0.74	Optima Technology MiniPak 8000DAT (HP)
	0.73	Procom Technology MDAT 1300/M (WD)
	0.72	Hard Drives International PowerDrive 2.0 DAT (WD)
	0.71	Relax Technology Vista Tape 2.2 GB (E)
	0.70	Transitional Technology CTS-8501 (TT)
	0.69	Optima Technology MiniPak 2000 DAT (HP)
	0.68	Legacy Storage Systems 2200D (WT)
	0.68	CMS Enhancements Platinum DAT 1300 (WD)
	0.68	Maynard Electronics MaxStream 2200HS (E)
	0.67	Procom Technology PMT600/M (T)
	0.63	Optima Technology MiniPak 600T (T)
	0.62	CMS Enhancements Platinum PST-600-SS (T)
Overall Slowest	0.61	Relax Technology Vista 600 Tape (T)

Small Backup (66.6MB, 1317 files)	Small Backup (with verifications)	Restore (80MB)	Retrieve (3.9MB)	Backup (300MB)	Restore (300MB)
375.5	NA	381.8	58.5	1217	1265
356.7	753	371.8	173.6	1212	1278
343.6	781	373.1	167.9	1227	1276
512.9	924	425.2	30.9	1603	1591
370.9	813	390.3	180.4	1252	1315
448.8	907	378.2	136.6	1264	1098
358.2	716	623.9	160.0	1177	1416
443.0	NA	376.6	332.7	1328	1242
433.7	889	408.3	234.9	1412	1416
555.1	NA	513.2	36.5	1799	1758
420.2	900	427.4	276.1	1594	1606
545.0	NA	551.7	39.6	1786	1828
412.8	845	435.1	240.0	1586	1813
432.7	931	426.8	332.4	1603	1823
461.5	876	448.5	264.5	1676	1694
460.7	881	453.9	265.1	1667	1693
459.5	881	453.0	265.4	1677	1693
454.5	914	437.9	256.4	1700	1702
460.3	875	458.7	263.8	1679	1692
453.5	914	440.0	256.3	1715	1697
455.1	904	445.7	256.3	1735	1697
442.4	1219	495.3	231.0	1433	1481
447.2	NA	439.5	237.4	1585	1603
787.9	NA	674.5	36.0	1711	1768
481.0	917	469.7	276.7	1739	1751
482.4	918	470.2	275.3	1742	1750
525.3	NA	563.2	228.2	1414	1492
615.0	NA	484.1	176.7	1475	1627
741.8	NA	759.0	36.7	1939	2053
544.7	988	481.3	278.8	1968	1719
484.1	NA	481.8	421.5	1695	1712
515.2	1141	700.8	344.7	1337	1632
526.3	1279	557.9	278.9	1587	1620
820.2	NA	750.1	67.4	1711	1768
650.0	NA	685.4	238.4	1467	1728
532.9	NA	665.7	299.0	1618	1983

Drives up to 500MB

Overall Fastest	1.00	APS Teac 155 (T)
	1.00	Optima Technology MiniPak 150T (T)
	1.00	La Cie Cirrus Tape 150 (T)
	1.00	Procom Technology PMT150/M (T)
	0.99	Liberty Systems 160T (T)
	0.98	CMS Enhancements TS-150-E (T)
	0.85	Hard Drives International PowerDrive 150T (SA)
	0.74	SunStor Systems Sun MT-150SC (SA)
	0.70	Relax Technology Vista 160 Tape (T)
	0.63	Maynard Electronics MaxStream 250Q (A)
Overall Slowest	0.47	Tulin Half Shell 155 Tape (T)

Small Backup (66.6MB, 1317 files)	Small Backup (with verifications)	Restore (80MB)	Retrieve (3.9MB)
634.3	1389	666.8	238.2
645.8	1366	668.1	239.2
646.0	1382	672.0	237.4
639.0	1376	678.6	238.8
642.9	1414	675.3	243.0
671.6	NA	667.4	393.0
776.4	NA	745.1	441.1
781.9	NA	756.7	449.5
776.6	NA	848.6	478.6
771.9	1814	997.7	929.0
883.4	2330	1796.4	1289.0

TALE OF THE TAPE

Company	Tape Formats Offered (Mechanism Manufacturer)					Software Manufacturer	A/UX Compatible	Warranty (in years)	Tech-Support Rating
	DC2000	DC6000	Teac	DAT	8mm				
APS			Teac	Archive		Dantz	no	1	excellent
Blackhole Technology		Tandberg		WangDAT	Exabyte	Blackhole & Dantz	no	1	not tested
Club Mac			Teac	WangDAT or Hewlett-Packard	Exabyte	Dantz	yes	1	not tested
CMS Enhancements			Teac	WangDAT		Surf City	yes	1	very good
Contemporary Cybernetics Group		Sankyo or Tandberg			Exabyte	CCG	yes	1	not tested
DynaTek Automation Systems		Tandberg		Hewlett-Packard	Exabyte	Dantz	no	1	very good
Fifth Generation Systems	WangTek					Fifth Generation	no	1	not tested
FWB		WangTek		WangDAT		FWB & Dantz	yes	1	good
Hard Drives International		Sankyo		WangDAT		Surf City	yes	1	poor
Hewlett-Packard				Hewlett-Packard		Dantz	yes	1	dealer support only
La Cie			Teac	Archive		Dantz	yes	1	very good
Legacy Storage Systems		WangTek		WangTek	Exabyte	Dantz	yes	1	very good
Liberty Systems			Teac	Archive		Centa & Dantz	yes	1	satisfactory
MacDirect				WangTek		Dantz	yes	1	not tested
MacProducts USA		WangTek		WangDAT or Rbyte	Exabyte	NovaMac & Dantz	yes	2	not tested
Maynard Electronics		Archive	Teac		Exabyte	Maynard	no	1	unsatisfactory
Memory Bank				Archive	Exabyte	Memory Bank	yes	1	excellent
MicroNet Technology		Tandberg	Teac	Sony		Dantz	no	1	good
Microtech International			Teac	WangDAT		Dantz	yes	2	not tested
Mirror Technologies				Archive		Diversified I/O	no	1	not tested
Novastor Corporation		Tandberg		Hewlett-Packard	Exabyte	Surf City	no	1	not tested
Optima Technology Corporation		Tandberg	Teac	Hewlett-Packard		Dantz	yes	1	very good
PCPC				Archive	Exabyte	PCPC	yes	2	not tested
PLI				WangDAT		Dantz	yes	1	not tested
Procom Technology			Teac	WangDAT		Dantz	yes	1	excellent
Relax Technology			Teac	Archive	Exabyte	Diversified I/O	yes	1	good
Sankyo		Sankyo				Dantz	no	2	satisfactory
Storage Dimensions				Hewlett-Packard	Exabyte	Dantz	no	1	excellent
SunStor Systems		Sankyo				Surf City	no	2	not tested
Tallgrass Technologies Corporation		Archive or Tandberg		Archive		Dantz	no	2	not tested
Tandberg Data		Tandberg				Dantz	yes	1	poor
Tecmar		WangTek		WangDAT	Exabyte	Tecmar	yes	2	satisfactory
Third Wave Computing				Hewlett-Packard		Dantz	no	5	not tested
Transitional Technology				WangDAT	Exabyte	TTI	no	1	very good
Tulin Corporation	Teac	Archive or WangTek	Teac	Hewlett-Packard or WangTek	Exabyte	*	yes	1	not tested

* No bundled software; provides Fifth Generation Systems' Fastback Tape at extra cost.

than Retrospect in our tests, and offers features that Retrospect does not, such as *mirror-image backups*—copying every sector of a hard drive, including empty sectors, to create an exact, one-to-one correspondence between disk and tape. Mirror-image backups are useful for copying damaged hard drives before attempting to fix them with disk-recovery software. Most backup software uses the space-efficient file-by-file backup method, which copies each file independently.

A new package bundled with drives from CMS, Hard Drives International, and Novastor is Surf City Software's SurfGuard. This easy-to-use program steps you through the entire backup. But SurfGuard could use better unattended backup op-

tions; you can set a future time for the backup to commence, but not a future date.

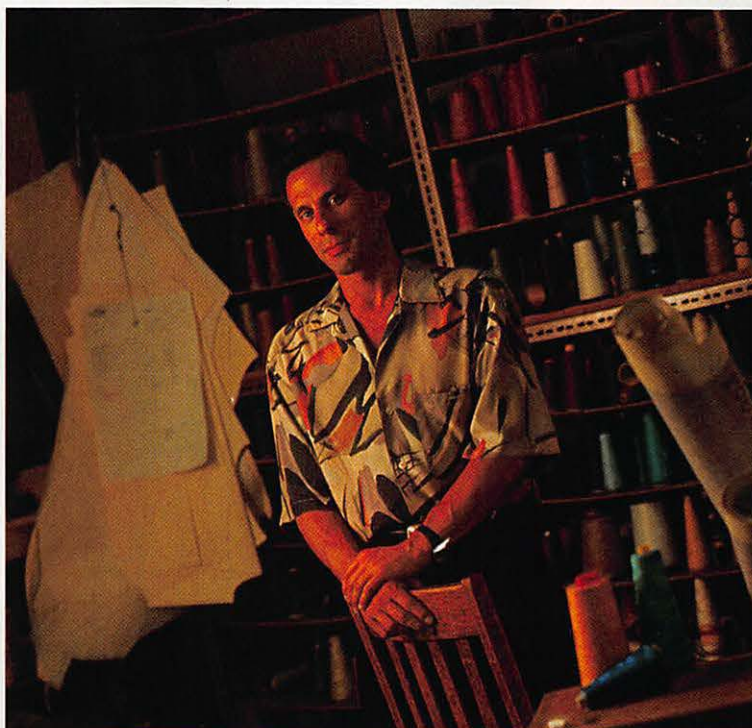
Optima Technology Corporation has taken an interesting approach to tape software with its DeskTape. This cdev (control panel for System 7) allows the tape contents to appear on the Mac desktop as though the tape were a hard drive. You back up to, and restore from, the tape by dragging files to or from the tape volume in the Finder. The great advantage to this approach is that there's nothing new for the user to learn in order to back up to tape; it's just like any other copy operation. The price for this convenience, however, is sluggish performance. Since tape is a sequential medium, you must wait until the tape fast-forwards or rewinds to the appropriate spot to

read or write a file. Add to this the well-known slowness of the System 7 Finder in copying, and it's no surprise that backups with DeskTape took much longer than with other software. But sometimes the easier, slower solution is more appropriate. If, for example, you wish inexperienced users to back up regularly, the Finder copying method works better. Another disadvantage of Optima's software—it's the only backup software we looked at that does not support timed backup. Optima also sells Retrospect with its drives as an extra-cost option, but our tests are based solely on DeskTape.

Picking the Right Drive

IF YOU'VE ONLY GOT A 40MB HARD DRIVE, DON'T bother with a tape drive; back up onto floppy disks with a program like Dantz's DiskFit Pro or Fifth Generation Systems' Fastback II. With these programs, floppy-disk backup is easy, and more cost-effective than tape. You can also use these programs to back up to a removable-cartridge or rewritable-optical drive. Those technologies fill dual roles as backup devices and as expandable storage.

If you are backing up more than 40MB, the backup task falls into three classes, which are determined by the amount of data that you need to protect. For personal backup, where you need to back up less than 150MB of data, go with a drive based on the Teac 150MB mechanism. Those drives are faster, quieter, and much less expensive than the 150MB/250MB DC6000 units. I like the Teac 150MB drives from APS, Optima, and La Cie: the APS for its low price; the Optima because of the DeskTape software option, and the La Cie



David Solomon of Overwear learned the value of tape backup when all his computers were stolen during the Los Angeles riots earlier this year. His athletic-clothing company was up and running only two weeks later, thanks to a current backup of account data.

for its space-saving upright design.

Midrange backup, from 150MB up to 600MB, is the province of the 525MB DC6000 drive and the Teac 600 units. Either of these drives will do the job admirably. The 525MB DC6000 units are much faster; the Teac 600 drives are generally hundreds of dollars cheaper. If your wallet has a bigger vote than your stopwatch, check out the Teac 600 drives from Club Mac, Relax Technology, or Procom Technology. If backup speed is paramount, the 525MB DC6000 drives from FWB, DynaTek, Optima, and Sankyo are good picks.

Network backup needs high capacity, and for this, look to a DAT or 8mm drive. If you are on a tight budget (under \$1400), look to a plain 1.3GB DAT drive from APS or Club Mac. Otherwise, get a compression DAT from APS or Third Wave, or one based on the fast Hewlett-Packard mechanism from DynaTek or Club Mac. Those drives will serve you well up to about 4GB; if you need more backup room, you'll have to turn to a 5GB 8mm drive from Relax Technology, Transitional Technology, or Legacy Storage Systems.

The vast array of tape drives on the market show strong enough similarity that your buying decision should be based largely on price, support, and bundled software, rather than performance and features. It's refreshing to know that in at least one peripheral-product area the choices are relatively straightforward. **m**

See *Where to Buy* for contact information.

TOM NEGRINO is a *Macworld* contributing editor.

Macworld Lab testing supervised by MARK HURLOW.

MW

EDITORS' CHOICE

Personal Backup (up to 150MB)

APS Teac 155 This Teac 150 drive is a great deal: it's fast, inexpensive, and comes with Retrospect backup software, and the company provides fast service and superb technical support. **Company:** APS. **List price:** \$499.

Midrange Backup (150MB to 600MB)

Vista 600 Tape For midrange backup on a budget, this Teac 600 drive is the lowest-priced entry we tested. While it was also the slowest drive in the over-500MB category, you can dramatically boost the drive's performance by buying Retrospect instead of using the drive's bundled SoftBackup, and still spend under \$950. **Company:** Relax Technology. **List price:** \$779.

hammerTape 525 The drive comes with Retrospect and FWB's own backup software, and the unit was the second-fastest DC6000 drive we tested. A low price brings it to the front of the pack. **Company:** FWB. **List price:** \$1469.

High-Capacity Backup (1GB and beyond)

APS Compression DAT Hardware data compression, close to top speed, great technical support, and low price—a rare and welcome combination. **Company:** APS. **List price:** \$1699.





THE 1992 MACINTOSH GAME HALL OF FAME



THINGS HAVE BEEN BUSY THIS year at the Macintosh Game Hall of Fame, located in beautiful (if somewhat desolate) downtown Pittsfield, Massachusetts. The bus tours keep coming, discharging tourists who, to be honest, arrive with some skepticism—and who are also a bit tired from touring the Norman Rockwell Museum that morning. But soon they're gawking at the World's Longest Mouse Cord, intently poring over the diorama portraying the history of Tetris, and taking in

BY STEVEN LEVY

ILLUSTRATION BY DAVID PETERS



the IMAX film of antebellum life in SimCity. By closing time, we can't pry them out. Just the other day

we came across a codger sitting in a corner we'd forgotten, furiously playing Wizardry at a dusty Fat Mac. Seems he'd been there for two weeks, living on Cheetos tossed to him by passersby who mistook him for an exhibit.

In fact, it's been a good year in all sorts of ways. We're finally seeing the bounty resulting from Apple's lower prices on color Macs and a long-overdue effort in its Cupertino headquarters to encourage development of entertainment software. (Would you believe Apple now has a Game Evangelist?) While not exactly a flood, the stream of games has been refreshingly steady. The result is a particularly competitive field for inclusion in the Valhalla of computer games, The Macintosh Game Hall of Fame.

Since the contestants are on tenterhooks waiting for the announcements (ever seen a tenterhook? neither have we), we'll note the rules and cut to the chase. Bribery won't get you into the Mac Game Hall of Fame, but true excellence will. The Hall's Curator and Chief Selector, yours truly, makes final determinations after an informal nominating panel of wise elders (and youngsters) suggests con-

tenders. While the categories are fairly constant, the Curator reserves the right to shoot with a little English—after all, sometimes a strategy game is also an arcade game, and the lines between adventure and role-playing are rather fuzzy these days. The idea is to allow the very best games to find their way into the Hall's hallowed chambers.

And here are those very best games—the Class of 1992.

BEST BRAIN GAME: Wordtris

Spectrum HoloByte. Requires: Mac Plus; 1MB of RAM; 2MB of RAM and hard drive for color; System 6.0.3. \$49.95.

You'd think that the clever Muscovites who first concocted the classic Tetris would have milked the last buck from the concept by now. Things reached a low point with Facetris, which dropped the literacy level of the series to that of Mr. Potato(e) Head. As it turns out, all that was merely a prelude to this 'tris, which takes the brilliant step of merging the familiar dropping-tile format to the wonderful world of words. Only legal reasons, I guess, prevented this game from being dubbed Scrabble-Tris.

As with the first iteration of the series, what appears to be a simple game winds up to be a maddeningly intricate challenge to one's cerebral powers. All that's re-

quired is to shuttle the dropping letters in one of several columns on the playing field so that they form words. Yeah, *right*—just like all that's required to get Russia on its feet is to install capitalism.

To really rack up big scores on Wordtris, you have to think far in advance; you've got to form words horizontally and vertically, in crossword fashion. Complicating things even more is a strange twist that has your first row of letter-tiles floating in a pool, then sinking as more tiles pile on. Then there are wild-card tiles (you pick the letter), bonus blocks (you get extra points if you form a word with them immediately), and magic words that you're dared to assemble.

Do you want more? There are several multiplayer modes where you can play competitively or cooperatively, either on the same computer or in parallel on a network.

Unfortunately, the playing field of Wordtris still displays the irrelevant tableaux of an archaic Soviet Union. And it still plays the kind of music only a Ukrainian peasant could love. So just turn off the sounds—Wordtris speaks for itself, louder than words.

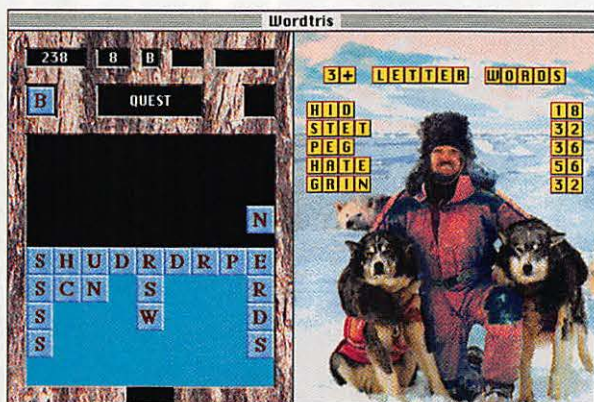
BEST ARCADE GAME: Prince of Persia

Brøderbund Software. Requires: Mac Plus; 2MB of RAM (2.5MB with System 7 in black and white, 4MB with System 7 in color); hard drive; System 6.0.2 (6.0.5 for color). \$49.95.

Scheherezade herself would be hard put to describe the sublime artistry with which one must negotiate the cavernous Arabian palace in Prince of Persia. So we'll keep it simple—if that Mac classic, Dark Castle, grew up to become a full-color, martial-arts extravaganza, this is what it would look like. The plot, as it were, requires you to control a suitor to the sultan's daughter, who is held prisoner by the evil Grand Vizier. You view the forlorn maiden in an opening screen and get glimpses of her as you ascend each level. But forget about a quick reunion; before you meet her, you not only have to perform feats of dexterity—sword fighting, jumping, and climbing—you also have to solve the puzzling mysteries of how to get from point A to point B when it seems impossible to do so. It will take you 1001 nights to complete it, but oh, what nights they'll be.

The best thing about Prince of Persia is the attention to detail. The animation is superb—not only when your alter ego runs and jumps, but also during more complex maneuvers such as hanging on to ledges. Particular care was taken in the depiction of death scenes. Children's advisory: Your demise is often accompanied

Wordplay Forget about that Slav with the huskies; the real action is on the left, where Wordtris is played. And we are just about to form the word *nerds*.



Sultans and Swords Your turbaned stand-in gloats over a vanquished henchman of the evil Grand Vizier. To win Prince of Persia, however, you'll have to out-sword many more turbaned opponents.



by gory graphics and a blood-curdling death rattle.

The worst thing about the game is its copy protection. Not content to force you to count words and letters in the manual before you can restart, Prince of Persia idiotically forces you to play a simplified version of the game itself. What a waste of time. We here at the Game Hall of Fame play Prince of Persia much less than we otherwise would, because just the thought of that mindless routine makes us return to our word processors.

BEST SIMULATION GAME: SimAnt

Maxis. Requires: Mac Plus; 1MB of RAM; 2MB of RAM for color (2.5MB for System 7 in color); System 6.0.2. \$59.95.

Master simulator Will Wright could have gone only two ways after he followed up his brilliant SimCity with the ambitious SimEarth—bigger or smaller. Eschewing SimUniverse, he wisely took the micro route, allowing us to do something that we ordinarily do only during business hours—participate as selfless drone workers in a colony of selfless workers. In other words, to become an ant.

This is more fun than you'd expect. For one thing, a player of SimAnt has much more control than your average worker ant—using any of about a zillion commands and gleaning information from a hundred or so screens and charts, one can actually become the secret commander of a colony of social insects while inhabiting the body of a single drone or soldier. You'll learn that being an ant is no picnic—besides coping with competing red ants, predatory spiders, and hungry larvae to feed, you have to worry about being pureed by a lawn mower.

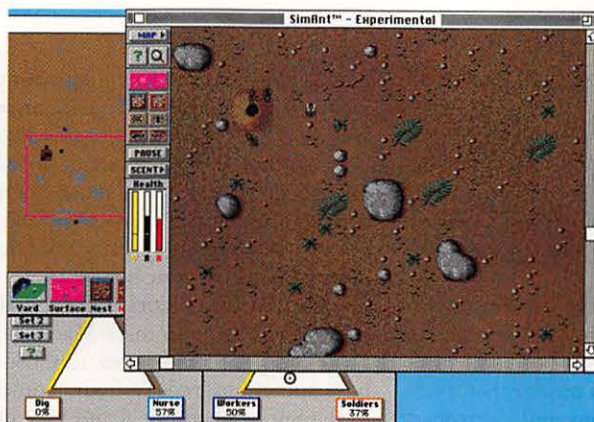
A limited version of the game pits your colony of black ants against a hill of red guys. It's great stuff—military strategy in miniature. For more thrills, play the full game, in which you get to engineer an attack on a house of humans!

Like all of Maxis's simulation games, SimAnt is grounded in real life—the bibliography in the wonderful manual refers to respected tomes by the likes of legendary entomologist E. O. Wilson. But instead of cracking the books to learn about ants, or following the little buggers as they meander along the sidewalk, a student of insect behavior might best spend time *being* an ant. And the way to do this is to play SimAnt.

BEST SIMULATION GAME, AIRBORNE DIVISION: Hellcats Over the Pacific

Graphic Simulations. Requires: Mac LC; 2MB of RAM. \$69.95.

Even those who feel sated by the present abundance of flying simulations



Mound, Sweet Mound SimAnt gives you several views of your anthills as well as all sorts of indicators telling you the status of your colony. It's the neatest thing on six legs.



Bombs Away A view from the cockpit in Hellcats Over the Pacific as you dive-bomb a Japanese aircraft carrier. In a split second you'll drop bombs, level off, and head for the airfield. If you sink the ship, you're due for a promotion.



Tanks for the Memories With Spectre, you get a barren battlefield, high-tech tanks, perpetual attacks from an army of opponents, and certain death awaiting you at any moment—now *that's* entertainment.

on the Mac would do well to sign up for a tour of duty in the World War II-torn South Seas. The controls of the simulated Navy F6F itself aren't as intricate as, say, the controls in Spectrum HoloByte's Falcon, and the real-time experience of flying doesn't approach the verisimilitude of Microsoft Flight Simulator. But the game has a gritty authenticity that's heightened by the most stunning graphics yet seen on a program of this sort.

The whole point of Hellcats has nothing to do with attempting some yuppie mastery of a flying machine; the idea is to attempt to replicate the very experience of a fighter pilot in the Pacific theater. The superior graphics add to the experience of trying to complete the half-dozen mis-

sions offered to Hellcats. The heart thumping begins early on; your view from the cockpit is an extremely cool replication of the real world, and it accelerates as you fend off fighters and begin your dive-bombing runs. Especially nifty is the view you get when ejecting yourself from the plane—a panoramic vista that more than softens the shame of bailing out.

Included are the requisite documents about the air combat, a technical manual, a big map of the Solomon Islands, and fewer hints than you'd like about actually flying the thing. But you pick up the right stuff as you blitz targets and win promotions, all at the expense of productivity and quality time with family. But hey, that's life during wartime.



BEST NETWORK GAME:

Spectre

Velocity Development. Requires: Mac Plus; System 6.0.3. Recommended: 2MB of RAM for color or sound. Single-user version \$59.95; LAN version with three copies \$99.95.

Played solo, Spectre is a reasonably addictive shoot-'em-up, most notable for shifting the player's viewpoint to inside the futuristic tank from which other futuristic tanks are targeted and destroyed. This takes place in a sparse cyberlandscape where only polygons can hear you scream.

On a network, Spectre is something else. Instead of taking on a herd of computer-operated opponents, you're pitted against real human beings in struggles to the death. Sure, the concept is stale—as are the other variations like capture-the-flag—but the execution is wonderful. So wonderful, in fact, that Spectre qualifies as the most marvelous multiplayer Mac game to date.

When a gang of experienced Spectre jockeys gather, the play is fast and furious. The game's controls become second nature; as one learns to survive, he or she develops a bag of tricks—certain evasive

movements, particular strategies for placing oneself behind an opponent, unspoken yet understood behaviors so that two can gang up on a single opponent. These individual quirks and peccadilloes emerge in such a way that the menacing tanks you see on your screen actually take on the characteristics of your human foes.

Those with Quadras have an advantage over those with mere Mac II's. The biggest edge, though, goes to those who have spent hundreds of hours enmeshed in the Spectre battlefield and have developed the requisite skills to kill without being killed too often. The fact that an otherwise intelligent person will actually spend that kind of time on Spectre is reason enough to qualify it as a Hall of Fame member.

BEST SPORTS GAME: Tristan

Amtex Software Corporation. Requires: Mac II with 4MB of RAM, or Mac LC with 2MB of RAM; color monitor supporting 256 colors; System 6.0.7. \$59.95.

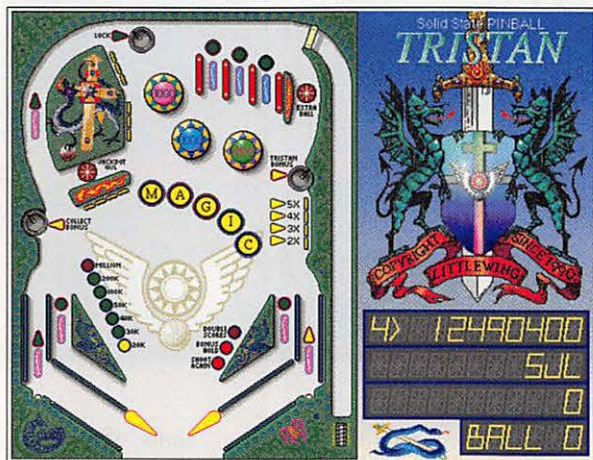
Testosterone-heads might object to our classifying pinball machines as a sport—but here at the Game Hall of Fame, we take our flippers and bumpers at least as seriously as the icons of the other indoor sports of our misspent youth

(Ping-Pong, pool, Trust Me, and so on). And when it comes to replicating the *feel* of an actual sport, the computer pinball machine called Tristan is unmatched.

Some might complain that Tristan, unlike the more versatile classic, Pinball Construction Kit, offers but one table. But that's why it's great. It reminds us of the days when you frequented just one candy store with a single pinball machine. You got to know the game's intricacies and the subtle stratagems required to win free games, thereby frustrating the geeky supplicants whose nickels gathered dust on the glass. Blissfully, Tristan has as many tricks and complexities as any Bally or Gottlieb—bonuses, rollovers, extra balls, and that special time when two balls are in play simultaneously and you can really rack up points.

When we got wrapped up in Tristan, it Felt Like The First Time, and we knew we were playing real pinball when the Game Over lights flashed; instinctively we hit the keys to play again. And again. And while our real lives impatiently waited—spouse, kid, career, Summer Olympics on TV—we played yet again. We might not accumulate the millions of points necessary to win the Tristan contest sponsored by Amtex (to enter, fax your high scores to the company by December 31 at 613/967-7902), but the reassurance is there—we still play a mean pinball.

Flippers and Bumpers No nickels needed; all that's required to play this pinball game, Tristan, are a computer, some manual dexterity, and a complete willingness to set aside career and family in favor of racking up points.



Pièce de Résistance Allied forces mop up German resistance in V for Victory (D-Day Utah Beach). Highlighted here is the outcome of one of several skirmishes won by our troops; the Americans (represented by green squares) are well on their way to neutralizing the opposition (the Germans, in gray squares).



BEST STRATEGY GAME: V for Victory (D-Day Utah Beach)

Three Sixty. Requires: Mac Plus. \$59.95.

War-strategy games are a world unto themselves and often fall into two categories: those simple enough to appeal to casual gamers and those sufficiently Byzantine to please the pedantic legion of desktop generals who take this stuff seriously. The V for Victory battle set is different. While simple enough to intrigue novices from the get-go, its depth rivals that of the most elaborate war game.

As a result, V for Victory is kind of a Trojan horse for battle-strategy gaming. Novices will have no trouble following the clearly written tutorial; they're guided through the first of several scenarios, which involves mopping up opposition after the 1944 invasion of Normandy—and it's not hard at all. Moving around the units of infantry, tanks, and engineers is simple; so is firing artillery and launching air support. Novices will have so much fun that it'll be a while before they realize they're not doing very well—it takes too long to rid the land of Nazi troops. The solution is to hit the manuals and learn more about the game, the war, and military strategy—these are things one needs to know to win that victorious V.

Everything imaginable about the post-D-Day battles is included here, from the proper divisions that duked it out in France to realistic weather conditions. Using your mouse, you'll uncover endless layers of information, all of which will affect the outcome of the campaign. How tired are your troops? Where's your anti-tank unit? And when you get good enough to win using the historical facts of November 1944 (winning consists of vanquishing the Germans in the most efficient and devastating manner), you can raise the crossbar and rewrite history—giving up Allied air supremacy, for instance. The game could keep you going for a year—even longer if you decide to keep your day job.

The only problem is that the game—at least our copy—tends to crash the system at untimely junctures. Solution: Save the game after every turn. At least Three Sixty doesn't stick us with off-disk copy protection.

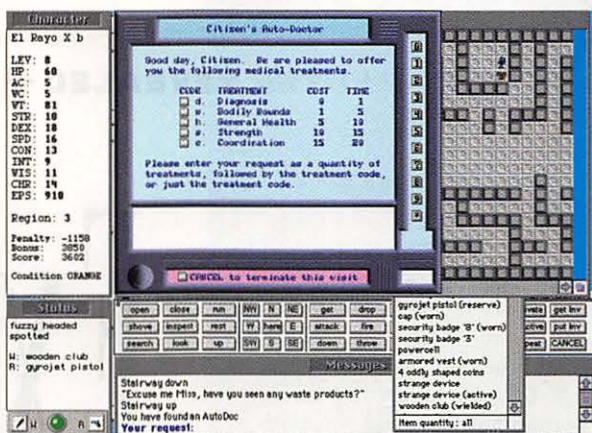
BEST ROLE-PLAYING GAME: Mission Thunderbolt

Casady & Greene. Requires: Mac Plus; 2MB of RAM; 7.2MB of hard drive space. \$59.95.

You'd think that after playing computer games for more than a decade, we'd have gotten tired of hanging out in dungeons; crawling into caves; wielding bizarre weapons; and fighting poison spiders, wild dogs, and slimy things. Well, we have. Then something like Mission Thunderbolt comes along, and it's back to the caverns for one more fling.

To be persnickety about it, Mission Thunderbolt takes place not in a dungeon but in an underground research lab where alien life-forms, making the most of a nuclear holocaust, are assembling an antimatter bomb to finish off life on Earth. (Where do they get this stuff?) Fans of Wizardry, Rogue, and other role-playing classics will recognize the essentials: explore the hell out of the place, gather weapons, don armor, try out pills, gain experience and health points, and get to the bottom of things.

Unlike many of its cousins in fantasy gaming, Thunderbolt doesn't go out of its way to make things difficult for you. (The exception is the installation process—in swapping seven disks in and out of your machine you get more wrist exercise than you would playing maracas in a mambo band.) There's no time clock working between moves, so you don't feel as if you're playing with the sword of Damocles hanging over you. All your actions are easily performed by the mouse. If you want to return somewhere in the maze, you simply click on the place and your alter ego



Heal Thyself The role-playing character in Mission Thunderbolt has gathered quite a bag of goodies—and quite a few maladies from getting bitten by various monsters. Maybe he can get fixed up by this Auto-Doctor, which is sort of a do-it-yourself clinic.

Monkeying Around One of the amusing, yet not terribly helpful, people you meet on Monkey Island is the storekeeper. He will, however, sell you shovels, swords, and breath mints.

scoots over there. If you're carrying too much money, you can put it in a bank. If you're low on health points, you can buy some vitality at a medical center.

Not that finishing Mission Thunderbolt is a breeze. It gets harder as it goes—you haven't known misery till you've been bitten by a fangwing—and sometimes you actually need to utilize good old-fashioned cognition. What a concept. Those in possession of the sort of skewed mind that takes to the arcane fantasies of role-playing games will happily devote hundreds of hours to executing Mission Thunderbolt, while their friends and relatives send out search parties.

BEST ADVENTURE GAME: The Secret of Monkey Island

LucasArts Games. Requires: Mac LC; 2MB of RAM; color monitor; hard drive; System 6.0.7. \$59.95.

With little fanfare, the adventure-game factory at LucasArts has been churning out the best interactive graphic narratives in the business. The Secret of Monkey Island is the best yet. While the pirate theme is far from original, Monkey Island makes it fresh by casting Guybrush Threepwood as your doppelgänger, a buccaneer wannabe who must accomplish three tasks in order to join the ranks of seafaring swine. Though the missions can be tackled in any order, interactivity is

subtly limited so as not to interfere with the firm narrative structure that gives the game a backbone that's not often found in adventures. The game is also quite forgiving—movements and actions are easily executed, and there's none of that instant-death stuff for opening the wrong door. Though your puzzle-solving ability is often tested, Monkey Island unfolds more like a movie than a classic computer adventure.

Fortunately, these guys know how to make a good movie. The graphics are compelling, the original music adds nice atmosphere, and the relatively long set-pieces of dialogue are so witty that what could have been a drag to sit through actually becomes a highlight of the game. Through these snappy conversations, the denizens of Monkey Island assume the same memorable appeal as character actors in vivid B-flicks—especially when, on your second and third encounters with them, they "remember" their previous exchanges with you and follow up on jokes that they set up earlier. It's good screenwriting—and state-of-the-art game writing. **m**

See *Where to Buy* for contact information.

STEVEN LEVY, *Macworld* columnist and world-renowned gamer, has tended the Macintosh Game Hall of Fame since its inception in 1986.



You're convinced aliens walk among us, but you keep hearing people talk as if this were just fiction. So you decide to write an op-ed piece for the local newspaper citing sightings and other evidence that prove you're right. You drop in to the local library to get your facts straight and then return home to pound out an article on your trusty Underwood typewriter. When done, you call the newspaper to find out how to submit it.

Without thinking about it, you have used the library, the typewriter, and the telephone to extend your innate capabilities. The library provides access to large amounts of information, the typewriter puts your words on paper, and the telephone gives you access to people not nearby. Similarly, a basic computer system extends its capabilities with various peripheral devices. For example, a high-capacity hard drive stores information, a printer puts text and graphics on paper, and a communications network puts the computer in touch with other computers. (The basic system is detailed in "Your Computer Revealed: Inside the System," *Macworld*, November 1992.)

Where the Files Are You can't possibly cram a library full of information inside your head, and neither can a computer hold all the information it works with in its system memory. People rely on books to augment what they remember, and computers similarly store volumes of information on hard drives, CD ROM drives, and other mass-storage devices. When you need a book, you can look through a library's card catalog, jot down the call number of the book you want, find that number in the stacks, take the book off the shelf, and begin reading. The computer goes through a similar process to access a file on disk (see "Retrieving Stored Information").

If you need a book from a library whose stacks are closed to the public, you give the call number to a librarian, who gets the book for you. On a Macintosh, file access begins when you double-click a file icon. The Finder makes a note of the file's location—which disk it's on and which folders to go through to reach the file. Then the Finder gives the location to the File Manager (which is part of the operating system software that resides in ROM) and asks the File Manager to get the file from disk.

Using the disk, folder, and file names supplied by the Finder, the File Manager finds the entry for your file in the disk's catalog. Catalogs for all disks except 400K floppies are organized hierarchically, like a family tree. The disk itself is at the root of this hierarchy. At the next level are the folders and files that you would see if you opened the disk icon. If you opened those folders you would see the folders and files at the next level, and so on. Imagine a library with separate card catalogs for various rooms—art, science, history, fiction—with the many cards in each catalog organized by topic and subtopic.

Organizing by Block Drives store files in sequences of uniquely identified *blocks*—usually 512K chunks of data—and the disk catalog specifies which blocks a file occupies. A file, unlike a library book, may be fragmented into several pieces, with each fragment stored at a different location. For a

Expanding

CHARLY FRANKLIN



by Lon Poole

THIRD

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P A R T

SERIES

the System

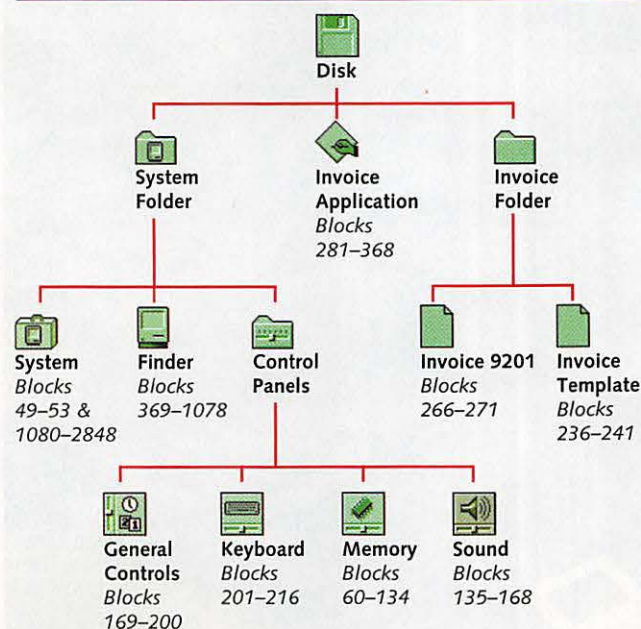


Retrieving Stored Information

The computer supplements the RAM on its logic board with various types of storage devices. Most devices store information—documents, applications, and so forth—in files. The system software organizes files and keeps track of their whereabouts in catalogs.

Despite similar file organization, the two most common storage devices, hard drives and CD ROM drives, use different methods to store data. Whereas hard drives read and write data magnetically, CD ROM drives read information optically.

FILE ORGANIZATION



The computer keeps track of all disk files in hierarchical catalogs. Each disk—a hard drive, floppy disk, CD ROM, or other device—has a catalog that specifies the location (numerical ID) for each chunk (block) of data in each file. The catalog is organized like a family tree that contains a name and an address for each person.

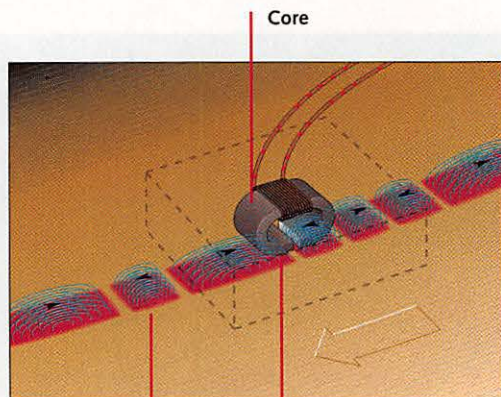
CD ROM DRIVE CLOSE-UP



3M PRE-RECORDED OPTICAL MEDIA

TRACING FILE RETRIEVAL IN A HARD DRIVE

When the computer asks a hard drive to retrieve specific blocks of information, the drive's logic board positions the read-write head over the track that contains the requested blocks (each block has a specific, known location). Then the logic board waits for the rotating disk to bring the requested blocks to the head. Magnetic changes in the disk surface spinning beneath the head generate electrical pulses. As the



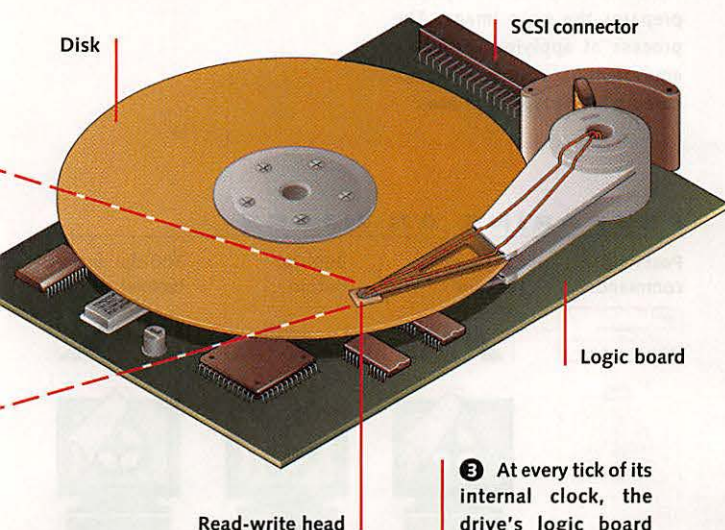
1 The tiny magnetic particles coating the disk surface are magnetized into regions with the same direction of flux (polarity). These regions pass beneath the drive's read-write head as the disk rotates clockwise.

2 The head's iron core becomes magnetized in the same direction as the passing region of the disk. Each change in magnetic direction generates an electrical pulse in the coil of wire wound around the core.

Instead of retrieving and storing information magnetically, as a hard drive does, a CD ROM drive reads prerecorded data optically. Inside the CD ROM drive, a laser focuses a beam of light on the bottom of a compact disc; the beam travels through the CD, which has been stamped with millions of bacteria-size pits during its manufacture. If the beam passes between pits, it strikes the CD's reflective top surface, which bounces the light to a photodetector, generating an electrical pulse. If the beam strikes one of the pits, the light scatters and does not generate a pulse. The drive's logic board interprets the on and off pattern of electrical pulses as binary digits and sends them eight at a time to the computer over the SCSI connector.



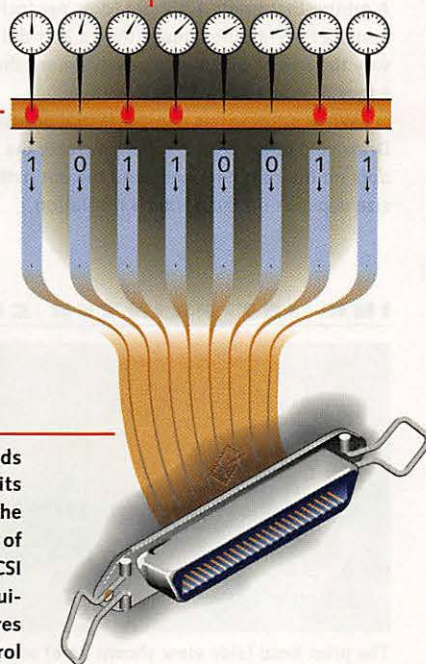
requested blocks pass the head, the logic board interprets the pulses as binary 1s and 0s and sends them to the computer. Conversely, when the computer sends data to the hard drive for storage, the drive's logic board converts the binary data to electrical pulses. Each pulse magnetizes the head momentarily, and the head resets the magnetic orientation of the region of the disk surface passing beneath the head.



3 At every tick of its internal clock, the drive's logic board checks to see if there is a pulse from the read-write head.

4 If a pulse occurs when the clock ticks, the logic board produces a binary 1. If there is no pulse when the clock ticks, the logic board produces a binary 0.

5 The drive sends eight binary digits (bits) at a time to the computer on eight of the wires in the SCSI connector (or its equivalent). Other wires are used for control signals, such as verifying that the drive is active.



fragmented file, the disk catalog lists the starting block and the length for each fragment. Although the File Manager knows which blocks make up a file, it does not know how to transfer the information in those blocks to or from a drive. That's the job of driver software. Each type of drive has its own driver, and the driver translates the File Manager's requests for blocks into commands the drive understands. The driver knows how the drive arranges information on the disk surface—in concentric rings called *tracks*, with each track divided into *sectors* that commonly hold 512 bytes apiece. The driver converts the File Manager's generic block numbers into the track and sector numbers that tell a drive where to find the blocks.

The Macintosh's file-access method is not unusual. Other computers may lack visual folders, but they too have a hierarchical filing system with directories instead of catalogs, and subdirectories instead of folders.

Encoding Data When a drive receives a command from the computer to access a specific track and sector, the drive's controller circuitry—its own logic board—signals an electromechanical actuator to position a read-write head precisely above the specified track. All this time the disk surface is spinning at 3600 rpm or faster, or about 37.5 mph at the disk's edge, and the controller keeps track of which sector is passing under the read-write head by counting timing marks laid down during disk formatting.

The data on the drive is encoded with magnetic particles on the disk's two surfaces (a hard drive may contain several disks) as a pattern of *magnetic flux*—basically, the change from particle to particle of the orientation of their north and south poles (see "Retrieving Stored Information"). With the read-write head above the specified track, the controller waits until the specified sector approaches. Inside the head, a tiny electromagnet senses the changes in the particle's orientation and in response generates a variable electrical current. The controller converts the variable current to digital data and sends it to the computer. When you save a file, the controller circuitry converts the file's digital contents to a variable current, which flows through the read-write head and resets the orientation of the disk's magnetic particles.

The workings of optical storage devices differ from those of hard drives. CD ROM drives, for example, do not have magnetic read-write heads and cannot write information. Instead, a CD ROM drive's read-only head focuses a laser beam on the compact disc's surface. The disc reflects the laser beam back to the read-only head unless the beam enters one of the many microscopic pits etched on the disc during its manufacture. A light sensor in the head generates an electrical signal when it detects a reflection but does not generate a signal when there is no reflection. The drive's controller converts the on-off signals to bytes of digital data and sends them to the computer.

Macintosh hard drives and CD ROM drives transfer data to and from the computer 1 byte (8 bits) at a time over a connection called SCSI—small computer system interface—that is the Mac standard for connecting storage devices and is increasingly popular on other personal computers. PCs that don't use a SCSI port transfer data 1 or 2 bytes (8 or 16 bits) at a time, depending on their hardware. Overall data-transfer rates range from 250K to 5MB per second, depending on the system.

Putting the Data on Paper When you want to put words on paper, you can write them out longhand or type



YOUR COMPUTER REVEALED

Expanding the System

them up. You could even "print" them by brute force, the way a computer does. Here's how: First make stencils for every letter and every graphic object on a particular page. Then you arrange the stencils on a sheet of graph paper and fill in every fully exposed square. The smaller the grid of your graph paper, the finer the detail of objects on the page—and the longer it takes you to fill in the squares. Could you make the stencils and neatly fill in 2 million squares in under a minute, as a computer and a laser printer do together? Not likely.

Printing begins on a Macintosh when you click OK in a Print dialog box. Your application prepares a description of every object on each page. For text, it specifies font, size, style, and so on. For graphic objects, the application specifies the shape, size, line weight, fill pattern, and other attributes. Think of these descriptions as stencils.

The application gives the description and position of each item to QuickDraw, which is part of the Macintosh Toolbox software in ROM. With the help of the Printing Manager, which is part of the Mac Operating System software, QuickDraw prepares a script of actions necessary to draw the whole page. This script is generic enough to work with any type of printer. The script is actually a list of QuickDraw commands, but you can visualize it as a stencil with outlines of all objects on the page.

Neither QuickDraw nor the Printing Manager sends the generic QuickDraw script directly to the printer. Printer driver software—each printer type has its own version—translates the generic script into a form the printer can use, and then sends the result to the printer. For example, the driver for a LaserWriter translates the QuickDraw script into a PostScript program and sends that program to the printer. (Like QuickDraw, PostScript is essentially a language used to describe text and graphics.) The LaserWriter's circuitry (essentially, its own logic board) executes the PostScript program, rendering an image as a pattern of toner dots converted from the original outlines (see "Printing a Document"). In contrast, the driver for a StyleWriter has QuickDraw prepare a page image on the Mac, and then the driver sends the image to the printer, which sprays liquid ink dots.

It's Data on the Line When you need to talk to someone across town or around the world, you pick up the phone and dial. In the same way, your computer can communicate with other computers, large and small. Computers can call each other over the public telephone network, and they can be wired together in private networks.

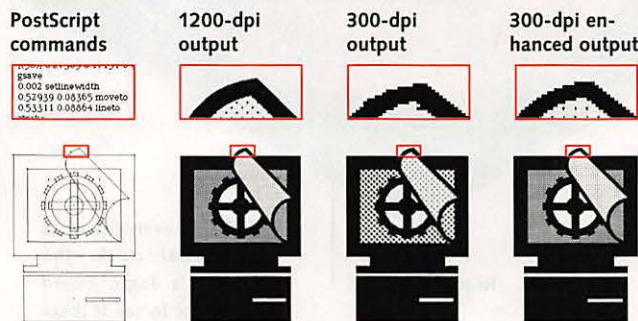
Computers communicate with each other by brute force—that's how they do most everything. They send and receive every byte of information serially, 1 bit at a time, thus the term *serial communication*. Imagine that you could not speak in words on the phone, but instead had to spell out every word using a phonetic alphabet, like "Echo Lima Victor India Sierra *pause* India Sierra *pause* Alpha Lima India Victor Echo." Still, because of their brawn, computers manage to communicate serially at adequate speeds (see "Communicating with Other Computers").

Unlike people, computers can't "speak" directly to one another over the phone. Before a computer's digital data can be sent over ordinary telephone lines, the digital data must be converted to sounds. On receipt, the sounds must be converted back to digital data. Each computer must have a modem (short for *modulator-demodulator*) to handle these conversion chores.

Printing a Document

Printing a document takes several steps. The application begins by preparing a description of every object on the page to be printed. Most Macintosh applications use QuickDraw, which is part of the system software, to describe the page. Then, depending on the type of printer, either the computer or the printer prepares the page image. The process of applying ink or its equivalent onto paper varies according to the type of printer.

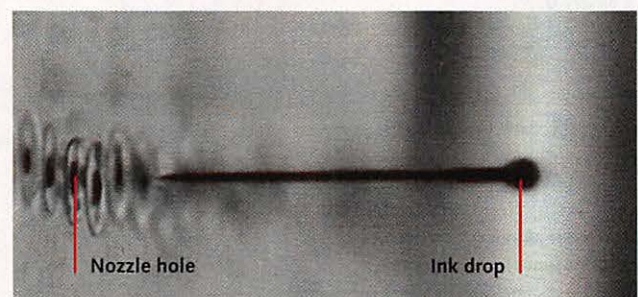
PREPARING AN IMAGE



To print on a PostScript printer, most Macintosh applications have the printer driver software translate QuickDraw page descriptions into PostScript commands and send them to the printer. The PostScript commands tell the printer how to create a page image as a pattern of dots. A printer that prints 1200 dpi (dots per inch), such as an imagesetter, prints a finer-grained image than a 300-dpi printer. Some printers can vary the size of the dots to achieve more shades of gray and smoother edges of printed objects.

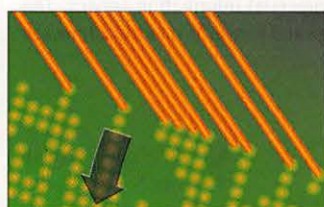
When printing to a non-PostScript printer, the printer driver, QuickDraw, and other system software create the page image as a pattern of dots on the computer and send the dot pattern to the printer. The dot size depends on the printer's resolution.

INK-JET PRINTER CLOSE-UP



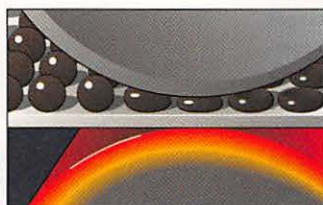
The print head (side view shown here) of an ink-jet printer contains a line of tiny nozzles that shoot liquid ink in thin streams. The printer forces ink through each nozzle as the print head travels across the paper, creating the dot pattern the printer receives from the computer.

TRACING A LASER PRINTER'S ACTIONS

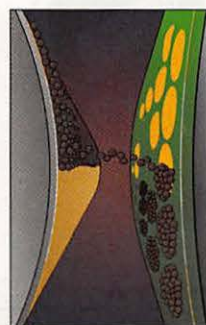


1 A laser beam inside the printer traces the image's dot pattern onto a rotating photosensitive drum, placing a static charge on the exposed areas.

7 A charged wire neutralizes any remaining charge on the drum, preparing it for a fresh exposure from the laser.



6 With heat and pressure, rollers fuse the loose toner to the paper.



2 As the photosensitive drum rotates, it passes a second drum that carries toner powder from a hopper. Toner particles are attracted to the first drum's charged areas.

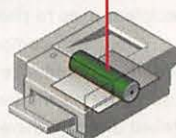


3 An electrically charged wire pulls the toner particles off the drum, and they fall onto a sheet of paper being fed between the drum and the wire.

4 A discharge brush removes the electric charge from the toner and the paper.

5 To remove any toner that didn't transfer, a blade scrapes the remaining particles from the drum into a receptacle.

Photosensitive drum

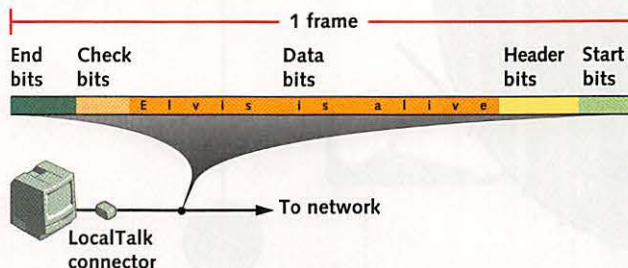


Communicating with Other Computers

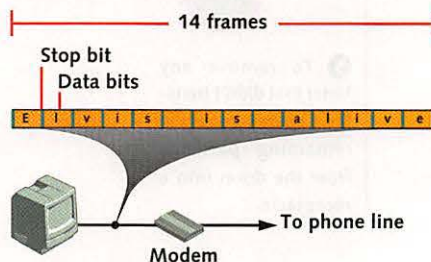
Although data moves through a modern personal computer's logic board 16 or 32 binary digits (bits) at a time, and between the computer and its high-capacity disk drives 8 or 16 bits at a time, the computer communicates with other computers serially—one bit after another. A computer can exchange messages and files serially with nearby computers (usually on the same floor or in the same building) that are physically wired together in a local area network. Distance is no factor when two computers communicate serially across ordinary telephone lines by using modems, which convert digital data to and from sound.

FRAMING SERIAL DATA

LOCALTALK PACKETS



MODEM PACKETS

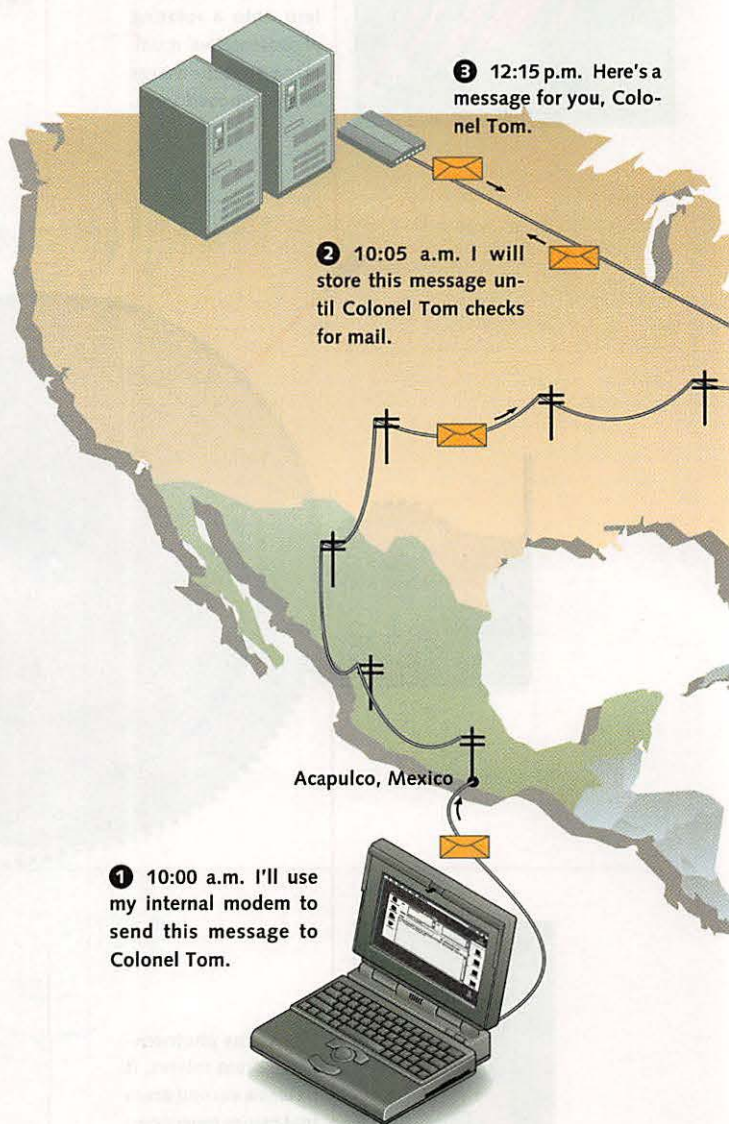


Computers send and receive data serially in packets and frame each packet with synchronizing signals. On a network, a header and a trailer frame each packet of serial data. The header marks the start of a frame (through start bits) and specifies the frame's sender, its recipient, and the amount of data it contains (through header bits). The trailer marks the end of the frame (through end bits) and contains statistics that the recipient uses to check the data for errors (through check bits).

When two computers are linked by modem, they exchange data serially in fixed-size frames, commonly 8 data bits per frame with an end-of-frame marker called a stop bit. Because the computers are linked directly, there's no need to specify the sender and recipient.

TRACING DATA EXCHANGE

Using a general terminal-emulation application or custom software, you can send a message by modem from anywhere you can make a phone call to the computer of a commercial information service. The service's computer stores the message and forwards it to the addressee.

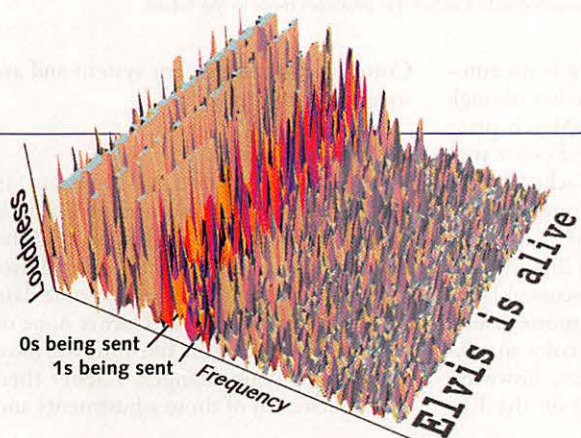
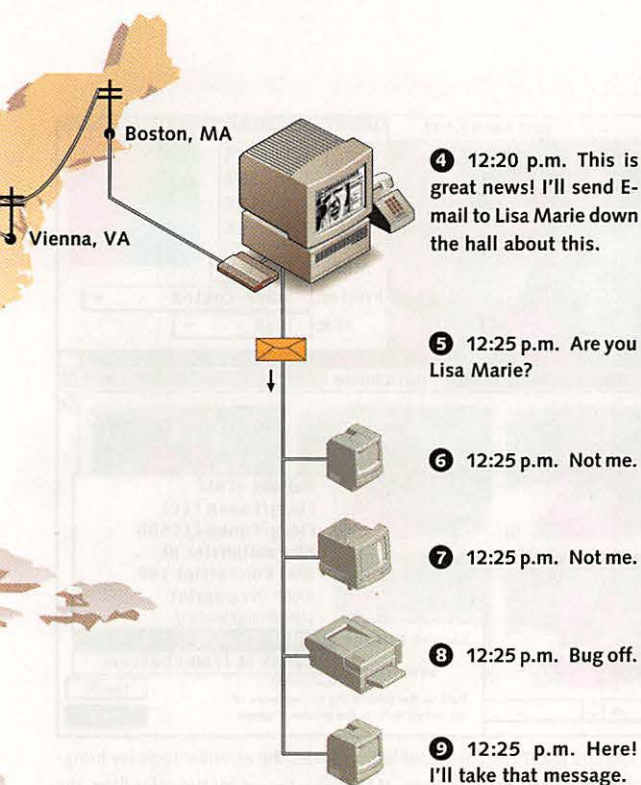


THE SOUND OF DATA

A modem sends and receives data as combinations of tones. At the slow speed of 300 bps (bits per second), the originating modem sends binary 0s as 1070Hz tones and 1s as 1270Hz tones, and at the same time receives 0s as 2025Hz tones and 1s as 2225Hz tones from the other modem. At transmission speeds above 1200 bps, modems encode digital data by varying the phase of sound waves (how they overlap) instead of their frequency, encoding 2 bits of data per phase shift. At right is a 3-D representation of the sound patterns sent over a 300-bps modem for the phrase "Elvis is alive." The peaks represent signals being sent.

when that person's computer contacts the service by modem.

By contrast, a message sent on a local network gets broadcast to every network device, but only the device to which it was addressed pays attention to it.



YOUR COMPUTER REVEALED

Expanding the System

The Party Line A computer doesn't need a modem to communicate with nearby computers if they are all connected in a private, local area network (LAN). A LAN is like a party line. If you have a party-line telephone, you have to listen to make sure someone else isn't already using the line before you place your call. During your conversation, anyone on the same party line can listen in.

Similarly, a networked computer must wait until the network is free before sending data. A computer sends data to another computer by broadcasting it on the network along with the network address of the recipient. All networked computers receive the data, but only the computer to which it is addressed pays attention to it.

Macintosh computers include all the circuitry they need to send and receive data on a LocalTalk network. (LocalTalk is Apple's LAN hardware standard.) Macs in a LAN need only be connected with telephone wire or other inexpensive cables. Macintosh Quadras come with additional network circuitry for connecting to a high-speed Ethernet network, which can be a local or geographically dispersed network. Other Macintosh models require internal or external adapters to connect to an Ethernet network. Most other types of computers must have network adapter boards installed before they can be wired into any network.

The software that handles network communications may be a part of the operating system software, extensions to it, applications, or a combination. The Macintosh Operating System, for example, includes the AppleTalk Manager and a set of device drivers that together let applications (or other parts of the operating system) exchange data with programs on other networked computers. This exchange follows a well-defined *protocol*—a series of steps—to ensure that data does not get garbled in transit.

Computer users interact with an electronic-mail application to send each other messages. They use other application-level software such as System 7's Finder to gain access to files on networked computers or file servers. Some printers, including most LaserWriters, are connected to a LocalTalk network, and anyone using a Macintosh on the same network can print to them with any application.

The Expanding Universe Telephone, typewriter (or word processor), and books are three common means of extending your capabilities. Communication networks, printers, and high-capacity storage devices are the most common means of expanding the capabilities of basic computer systems, but not the only ones. In addition, you can add a scanner to bring printed graphics into your computer as digitized pictures and, with the aid of optical character recognition (OCR) software, to bring in typed or printed text. A video digitizer creates still pictures and motion pictures from a video camera, video recorder, or other video source. A computer can play musical instruments and music synthesizers if equipped with MIDI (Musical Instrument Digital Interface). These devices greatly enhance your computer's versatility, yet they are only the beginning of the expansion story, a story with nearly limitless variations that is not likely to end soon. **m**

Contributing editor LON POOLE has written *Amazing Mac Facts* (Microsoft Press, 1991) and *Macworld Guide to System 7* (IDG Books Worldwide, 1991).

Informational graphics by ARNE HURTY.

REVIEWS

IN THIS ISSUE: CompuServe Information Manager, Omnis 7, Kodak Renaissance, JobTracker, AutoCAD, Power Menus, PersonalFont, UpDiff, SnapBack, MacBreadboard, and more

Color Image Editor

Cachet 1.0

PROS: Tools are well organized; minimizes data loss during correction; MultiChoice lets you set controls visually; clipping alarms warn of unprintable images; good color matching on output; high-quality separations. **CONS:** Slow, especially in high-resolution and MultiChoice modes; can only have one image open for correction; sharpening only on output; poor sharpening. **COMPANY:** Electronics for Imaging (415/742-3400). **REQUIRES:** Mac II (LC and IIsi require math coprocessor); 5MB of RAM; hard drive; color monitor; 8-bit color video board; 13MB free space on hard drive. Recommended: 8MB of RAM; 24-bit color video board. **LIST PRICE:** \$595.



IT'S NOT OFTEN THAT AN APPLICATION emerges that's as innovative as Electronics for Imaging's (EFI) Cachet. Billed as a "color editor," Cachet's main goal is to prepare scanned images for print—correcting, adjusting, sharpening, and separating. The tools, interface, output, and documentation are all quite impressive for a first version, though it still has some serious failings.

One of the central tenets underlying Cachet's design is that most photographs need correction before going to print. Simply adjusting the colors in a scan to match the original (using scan-calibration software such as Savitar's ScanMatch) does not solve this problem. Using calibration software can, in fact, reduce the quality of output, because data is necessarily lost in the automated correction process, before you even get to the inevitable data loss that is involved in manual correction.



Colors with Cachet Cachet's Exposure and Tone palette, at left, provides the essential tools for bringing a scan to printable form (including the Tone Clipping alarm, at bottom). Except for the color filter, the controls all affect the exposure of different parts of the image. The MultiChoice window is set to show a range of exposures (note the pop-up menu in its lower left), but it could show a range for any of Cachet's settings. The Color Meter (upper right) lets you determine the values in any section of an image (but not in a MultiChoice window). The Gamut Alarm (lower right) highlights colors that are outside the printer's capabilities (note the grayed-out areas in the background image). The pop-up menu (on the lower right) lists the device profiles currently provided with Cachet. EFI promises more in the future.

For those reasons, there is no automated scan correction in Cachet (though you can certainly use ScanMatch prior to opening a file in Cachet, if you want). Nor is there provision in Cachet for the almost impossible task of simulating on screen what will come out of a printer or printing press. The Tone Clipping and Gamut Clipping alarms (discussed later) address that issue in a more useful manner. You will find good color matching between output devices, however, thanks to Cachet's reliance on the Efi-

Color color-management system and associated printer profiles.

Making Changes

THE GOAL OF AVOIDING DATA LOSS before all corrections is central to Cachet's whole approach. Unlike in Adobe Photoshop—where you use one adjustment tool after another, losing some data with each correction—in Cachet none of your changes affect the file until you have made all of your changes. Cachet then concatenates all of those adjustments and

applies the result in a single pass (when you save or print).

You can, of course, see changes on screen as you are making them. By default, Cachet displays a reduced-resolution version of the image, so you can quickly make changes without having to wait for lengthy screen redraws. The correction tools are arranged so you can quickly work through the various controls, adjusting them in relation to each other to achieve a well-corrected image (see "Colors with Cachet").

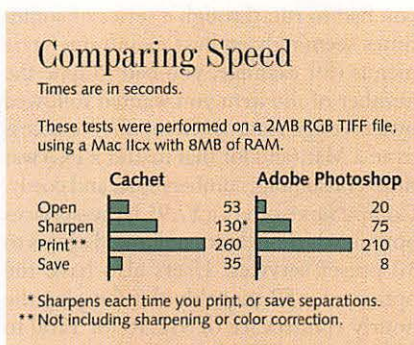
There are three control palettes in Cachet—Exposure and Tone, Color, and Selective Color. The Exposure and Tone palette contains the majority of the correction tools, arranged top to bottom in a logical order. You can perform most corrections with this palette alone. The Color palette then lets you adjust color cast, saturation, and lightness, after you have your basic exposure controls set. The Selective Color palette enables you to select specific colors and areas of an image for correction.

Cachet's MultiChoice feature is perhaps its most impressive innovation. It lets you see several renditions of an image side by side, with a range of settings (various exposures, or black points, or highlights, and so forth) and select one by clicking on it. If you have settings you like, you can grab a snapshot, which you can revert to later. Or you can save a script, so you can apply all the same settings to another image without writing them down and setting them manually.

Unfortunately, while MultiChoice lets you see different settings for a single control, there's no way to see multiple renditions with different groups of settings at the same time. You can only have one image open for correction, so you can't, for instance, compare Snapshot1 to Snapshot2 to see which looks best. (You can save multiple versions of an image, open them for reference, and compare them, but you then have to close them and open one image for correction to work on it.) You can save images in TIFF (RGB or CMYK), PICT, Photoshop, or EPS (with DCS option) formats.

Tone and Gamut Clipping

TWO UNIQUE CACHET FEATURES THAT I find most useful are the Tone Clipping and Gamut Clipping alarms. The Tone Clipping alarm lets you see any areas of the image that are clipped—pure white or black (which you generally want to avoid because they indicate loss of shadow and highlight detail). You can tweak settings to avoid the clipping, then check again. The Gamut Clipping alarm checks for colors that are outside the capabilities, or



gamut, of your printing method. So, for instance, you can gradually increase the saturation for a colorful scene, checking each adjustment with the Gamut Clipping alarm, to get as saturated an image as possible without producing something unprintable.

Both of these alarms would be better if they were fully live and interactive, rather than requiring you to press a button after making each correction to see the problem areas (as you change settings the clipping mask changes). The alarms would also be more useful if they worked in MultiChoice windows. As they stand now, however, the alarms are almost essential, and I sorely miss them in Photoshop and its ilk.

Edit by Reference

ANOTHER UNIQUE ASPECT OF CACHET's approach is the edit-by-reference technique. The program comes with 24 reference images—both on disk and in printed form. You can open an image for reference (so it isn't affected by your corrections) that has colors and lighting similar to the image you're correcting. Then you adjust the colors in your image to match those in the reference image. By looking at the printed reference image, you get some idea of what your image will look like when printed.

In practice, I find working with reference images extremely difficult. First, it is hard to find an image that matches yours (aside from various skin tones and blue skies). You can build your own library of reference images in the course of using Cachet; and additional reference images are available from PhotoDisk (206/441-9355), which sells CD ROMs that are full of scanned images. But even with four times the number provided with Cachet, I could not find one with dirty white snow (only with virgin, sunset-lit snow).

The other problem with editing by reference is getting colors to match. You can adjust one part of an image—people's faces, for instance—so it matches beautifully, but you might end up with blue gray

trees instead of green ones. If you then adjust the trees' color, the faces are wrong.

Selective Editing

IF THERE'S NO WAY TO CORRECT AN overall image to get all the colors right, you can use Cachet's Selective Color palette. There are tools for selecting all instances of a color ("gimme everything that's the color of those blue jeans") and for masking out areas that you don't want to correct. Then you can change color cast, saturation, and lightness for those colors, or use the eyedropper tool to replace them with a color selected from another part of the image.

Cachet's selective editing works well when you need to make simple changes ("turn down the saturation on those neon green tennis shoes!"), but it is less effective for complex images (leaves and trees against a stone wall). And since Cachet is missing the blending, smudging, and blurring tools familiar from paint programs, it's often difficult to blend selectively modified areas with their backgrounds.

Cold Blackstrap Molasses

CACHET HAS PROBLEMS WHEN IT comes to resolution, zooming, screen redraw, and display speed. It doesn't let you interrupt screen redraw (arguably Photoshop's best feature), so these problems are triply exacerbated.

With a single image open, displayed at Cachet's Standard resolution, the program's speed of display and operation is just fine. If you open a MultiChoice window, however, Cachet has to display the image six times, and it starts getting slow (but it's still quite usable on a Macintosh IIcx). If you switch to a higher-resolution display mode (Zoom Detail and File Detail), however, especially with a MultiChoice window open, the program slows to a crawl. Simply moving a window, adjusting a slider, or opening a palette can involve a 45-second wait (or even longer).

Also, Cachet often changes magnification and view when you change detail mode—more zooming and panning, more lengthy redraws. In just about every activity, Cachet is much slower than Photoshop (see "Comparing Speed"). For extensive use of Cachet, you should plan to use a very fast machine and avoid high-resolution modes.

Cachet's greatest failing, however, is its sharpening, which is essential to quality output. Cachet applies sharpening only when you print, or when you save separations. It takes a long time each time; there are only five settings (none, low, medium, high, or maximum), which gives you very

continues

little control; and you never see the sharpening on screen—you have to judge how much you need based on printed output. The results are extremely disappointing—nowhere near the quality resulting from Photoshop's Unsharp Mask Filter.

Otherwise, Cachet really shines on output, especially in matching colors between output devices. The colors you see from a ColorScript printout are remarkably close to what you see off press—much better than Photoshop's matching. Unfortunately, you need to correct scans in Cachet, save them, run them through Photoshop's sharpening, save them again, open them again in Cachet, and then separate them.

What to Buy

IF I HAD TO BUY JUST ONE IMAGE EDITOR, I would buy Photoshop and wait for the next version of Cachet, because of Photoshop's speed, excellent sharpening, and wider range of tools. Cachet's clipping alarms, MultiChoice feature, and logical layout of controls, however, in addition to its separation prowess and color matching, make it very attractive to both advanced and novice users—if you also have Photoshop. If you produce many separations and can afford it, buy both.

—STEVE ROTH

Graphical Interface for CompuServe

CompuServe Information Manager 2.0.1

PROS: Makes CompuServe services easier and faster to access than before. **CONS:** Not all services accessible through icons, menus, or key commands. **COMPANY:** CompuServe (614/457-8600; 800/848-8199). **REQUIRES:** Mac Plus; hard drive; modem; System 6.0.5. **LIST PRICE:** New members \$49.95; current members \$25 or \$10 download from CompuServe.



A NEW WAY TO INTERFACE WITH the CompuServe online network has arrived with CompuServe Information Manager (CIM) version 2.0.1. CIM is CompuServe's proprietary interface to more than 1700 services and databases on the network.

Before CIM, Macintosh users of CompuServe needed to use terminal-emulation software to access information. You were forced to manually enter a numeric dial-up string followed by a network-identification number, user password, and log-on, just to access the network. To get to useful information,

you had to run through a series of sometimes seemingly endless mainframe-style menus (for example, you had to type the number of the item you wanted followed by a carriage return). CompuServe access from a Mac (and for that matter a PC) was time-consuming, cumbersome, and costly. CompuServe offers a \$7.95 basic-services option, which includes unlimited access to 30 preset services. Users also have the option of a \$2 monthly flat fee plus the hourly connect fee of \$12.80 for 1200 to 2400 bps, or \$22.80 for 9600-bps access. Additional charges for accessing some databases are set by the vendor.

CIM enables you to sign on to the network and reach some information solely by double-clicking on a button on the screen. Yet much of the heart of the system still requires you to type a number followed by a carriage return to select a menu item that has that number.

CIM 2.0.1 goes one step further than its predecessor (version 1.6) in ease of network use. Probably the most notable change in CIM is the colorized interface. The color presentation on screen is definitely more appealing than the black-and-white version. CIM allows you to remove the CIM Data File, which contains the color icons, if you are using a monochrome monitor.

CIM 2.0.1 is quicker than its predecessor in accessing the network, disconnecting from the network, displaying information in the filing cabinet, marking lists in forums, and updating in the background. None of these functions are new, just quicker.

Balloon help, for System 7 users, is a new addition to the product. It works, but there are two problems. First, balloon help is not fully implemented (the icons within the Browse or General Services menu have no help). Second, most of the balloon help refers you to another help area, found under the System 7 Balloon Help menu. Consequently, you often must go to two places to find the information you want.

The Executive News Service (ENS) is greatly enhanced through a windowed interface. This interface simplifies selecting news sources, setting up routine checks for certain types of news, and downloading information to predefined folders, where you can read it offline.

Sending and receiving mail is easier, too. CIM now lets you create group addresses—addresses that contain a set of individuals to whom you want to send mail. The address book also has a sort feature that enables you to sort by first name, last name, address, or comments in ascending or descending order.

CIM still needs the ability to easily

add new names and addresses to the address book or group address. You have to know the member's name and address (which you can cut and paste from the Membership Directory section of CompuServe). You cannot simply point to a member's vital statistics online and automatically place them in the address book (as you can on AppleLink).

Out of all CIM's capabilities, Forum Messaging is the only complete implementation of Apple's human interface guidelines (HIG). You can either point to an icon on the screen, use a key command, or use a pull-down menu to execute a command. Also within the Forum area, a new feature of CIM enables you to compose messages offline and then send them to the correct place on the forum you've chosen.

CIM 2.0.1 enables you to manage information more easily from within databases. A new feature enables you either to file an article in a filing cabinet or to forward it to another member.

Finally, the controls layered into CIM 2.0.1 for the CB Simulator make this forum much easier to access and more fun to use. You can tune in to one of the 36 channels in Bands A or B just by pushing a button. You can monitor a band, see who is using a channel, and find out its status by simply clicking on a button in the Selector.

While these new features make CIM more Mac-like, it still needs some improvements. First, it needs to implement HIG more completely. There are many partial implementations throughout the product—for example, you can use the keyboard to execute commands in one forum but must use icons in another. Second, only some of the services have a Mac interface. When you reach many services or databases, you are back in the world of type 1 and hit return to select the first menu item. CIM paints the screen one line at a time in terminal-emulation mode and is often slow to execute commands.

There also needs to be some easier way to find out about the 1700 available databases and their pricing (aside from combing the manual or going online). CompuServe is blessed with a host of information databases; yet finding what you want isn't always easy. My suggestion is that CompuServe implement a downloadable file (as a part of CIM) that lets you get online help (a description of the database along with surcharge pricing) for each available service and database. If this file could be updated periodically, you could figure out, offline, a lot of the searching you wanted to do online before you got there.

continues

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for the Macintosh...**

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Type of Transaction

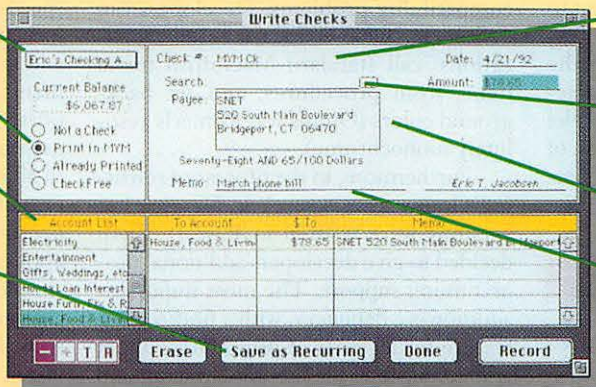
Pay bills by check or electronically via your modem.

Account List

Link your bills to an infinite number of budget categories. "Speed scroll" through your customized list in a split second.

Save As Recurring

If this is a payment you make over and over, the program can automatically remind you.



Check Number

Automatically entered, but you can easily override it to track more than one series of check numbers.

Payee

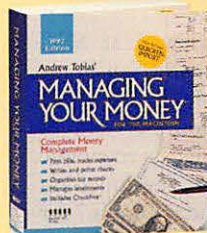
"Remembers" every check you've ever written. Enter it once, and with "Payee Search," you never have to enter it again.

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System Requirements:

Macintosh — System 6.0.2 or later. System 7 compatible. Mac Plus or later. 2MB of memory recommended. 3MB of free hard disk space for installation. Macintosh version does not perform all of the functions in DOS version.
DOS — IBM PC, XT, AT, PS/1, PS/2 or IBM-compatible. DOS 3.0 or later. 512K RAM. Hard Disk. All rights reserved.

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Finally, consistent pricing across all CompuServe services (as America Online and AppleLink have) would make the network a lot more user friendly (it's hard enough to keep track of what you want to find, let alone decipher your bill).

Overall, CIM 2.0.1 is a step in the right direction—making information access from CompuServe friendlier for the Macintosh user. A full implementation of HIG would make the product even better.—BERNARD J. DAVID

Database-Development System

Omnis 7 1.1

PROS: Has more speed and more features than Omnis 5; easy prototyping; includes top-notch debugger; generates Windows-compatible code.

CONS: Not for neophytes. **COMPANY:** Blyth Software (415/312-7100). **REQUIRES:** Mac Plus; 2MB of RAM (2.5MB for System 7); System 6.0. **LIST PRICE:** \$1250.



OMNIS 7 IS THE LATEST IN A LONG line of database-development products from Blyth Software, and it represents a strong argument for making continual small improvements rather than quantum-leap breakthroughs in product development. The product is the clear descendant of the modestly successful Omnis 5 (there was no Omnis 6), but Omnis 7 contains enough incremental advances to be a much more powerful programming environment.

Omnis has always been fast enough—the principal complaints about it have concerned the features list and programming facilities. The new version addresses both areas. In addition, some clever software engineering makes it a strong competitor in both the Mac and Windows markets—a serious advantage over traditional Mac favorites 4th Dimension from ACIUS and Helix (formerly Double Helix) from Helix.

Newsorthy

OMNIS 5 WAS RELATIVELY EASY TO learn, but part of the reason for this ease was the Spartan, feature-poor, un-Mac-like character of the applications it enabled you to create. You couldn't include pop-up menus or lists; you couldn't split windows, which could contain only fixed objects; and you couldn't cut and paste between data windows and reports.

Since these details had no analogs in the DOS world, there was an argument for leaving them out, albeit at the cost of impoverishing the Macintosh develop-

ment environment. Now that the operating system on the other side of the fence is Windows, Blyth Software provides Omnis 7 with all these features—and no compatibility problems. Developers can define special hierarchical menus in applications, call standard Macintosh menu items from procedures, and set background colors (Omnis was formerly resolutely monochrome).

Furthermore, in the process of rewriting Omnis from scratch in C++ (earlier versions were written in Pascal), Blyth decided to give developers additional programming support. The most important addition is a debugger, with a find/replace feature for all parts of procedures, direct and conditional breakpoints, tracing and single-stepping through procedures, and the ability to view any field's contents while a procedure is being executed. Since Omnis procedures are typically built from commands that you choose from scrolling lists, applications tend to be quite solid; but now you can track down any bugs that creep in. Programmers can now pass variables between procedures and between external programs and an Omnis application. Omnis 7 supports a binary field format, so any type of data can be held in a record. In addition, the system has 30 new combined date/time formats, "list" can be a field type, and programmers can access multiple databases simultaneously as lookup files.

Goodies, Speed, and Real Life

OMNIS 7 INCLUDES TWO SAMPLE programs: a contact manager and an invoice application (see "Just Plain Bill"). While these could both be used as real applications, they're included mainly as coding examples; Blyth is not interested in supporting database beginners with a huge array of canned applications.

Support for professional database developers is another matter. The speed of sorts, searches, and file import/export has been improved by 20 to 30 percent over Omnis 5. This means that for medium-size files (15,000 records) Omnis 7 is

slower than FoxBase+/Mac 2.01 and comparable to 4th Dimension 2.2.1 (speed depends on application-coding details, so specific comparisons are misleading). But speed of applications development is even more crucial to the developer's livelihood, and in this regard there are key improvements. Omnis 7 includes an Instant Report option with automatic formatting generated through a dialog box, preview of all report pages, and copying of report output to the Clipboard. It's possible to prototype a perfectly respectable small application with imported data files, simple procedure command menus, and customized instant reports in an hour or so of hands-on effort. FoxBase+/Mac is faster, and 4th Dimension has a richer command set, but Omnis 7's plain, businesslike functionality produces solid applications without much fuss.

Developers I interviewed at SFC Desktop Business Systems in San Francisco; Escape in Costa Mesa, California; and Aviation Information Services of Denver emphasized Omnis 7's economic advantage: an application developed on the Macintosh will run under Omnis 7 for Windows with essentially no changes. When the application is first ported to Windows, the developer must check and adjust for differences in font width and screen background color—an activity that typically takes a few hours for a commercial application.

Work in Omnis 5 can also be carried into the Omnis 7 environment with only minor changes. Publish and subscribe, Apple events, and Windows Dynamic Data Exchange features are implemented on both platforms; the program picks the correct platform-specific data-exchange commands at run time. Similarly, all help information is stored in a special data file used as the help source for an application; the program matches the on-screen implementation to the platform—the text in balloon help on the Macintosh appears as string help at the bottom of the Windows screen. While FoxBase+/Mac also offers Windows and Macintosh versions, most developers claim a bigger compatibility gulf and more up-front effort in coding.

Big Things in Big Packages

OMNIS 7 IS THE VERSION FOR STAND-alone and local area network (LAN) development, and it includes the database development kit plus extensions (access to external routines). Run-time modules (Blyth calls them deployment kits) cost \$250 each, and the upgrade from Omnis 5 to 7 is \$325. Omnis 7 Plus, at \$2500, is the version for SQL access. Besides the

continues

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Just Plain Bill Omnis 7 includes a basic invoicing application, and developers are encouraged to inspect its procedure code as an example of proper Omnis style.

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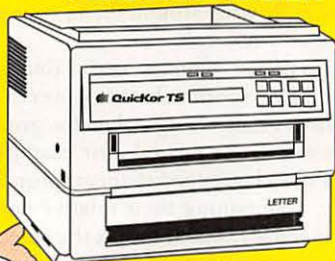
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Omnis 7 material, Omnis 7 Plus includes the Omnis Connects package: SQL Express (a basic, ready-to-run SQL front end), SQL Server (for Microsoft and Sybase access), access to Oracle databases and Apple's Data Access Language, and SequeLink drivers (used in some A/UX, OS/2, and VAX/VMS systems). Graph-It, a basic business-graphing program, is also included, probably as an inducement to developers to present SQL-downloaded data to busy executives in picture form rather than as tables. Deployment kits for Omnis 7 Plus cost \$500 each, and the upgrade is \$650 plus \$150 per user.

All in All

MANY OF THE DATABASE APPLICATIONS developed in Omnis tend to be straightforward accounting, inventory, and business-management packages—page after page of boxes full of 9-point Monaco text. But simplicity can be an advantage, especially in preparing SQL-based company-wide reporting systems. Omnis enables developers to code bug-free applications in minimal time, and get Windows code for the same application with little additional effort. I fully expect any database roundup for the year 2002 will include Omnis 13, which will still not be the fastest or flashiest but will have an army of loyal developers.—CHARLES SEITER

Page-Design and -Layout Software

Kodak Renaissance

PROS: Good blend of page-layout and drawing functions; handles multiple page sizes simultaneously; powerful libraries function. **CONS:** Many features poorly implemented; inconsistent with Macintosh conventions; inadequate documentation. **COMPANY:** Eastman Kodak (716/724-4000). **REQUIRES:** Mac II (LC and IIsi require math coprocessor); 5MB of RAM; hard drive; System 6.0.5; Adobe Type Manager and Type 1 PostScript fonts; 32-bit QuickDraw. **LIST PRICE:** \$695.



TO LURE AWAY DEVOTEES OF Aldus PageMaker and QuarkXPress, a challenger would need to include the best features of the two leading programs and add its own unique and powerful features. Most designers and business users are wary of plunking down the cost of a good fax machine for untried software that may or may not make their jobs easier, especially given the time they have invested learning their current programs. Kodak Renaissance, created by Atex and marketed by Eastman Kodak, provides several

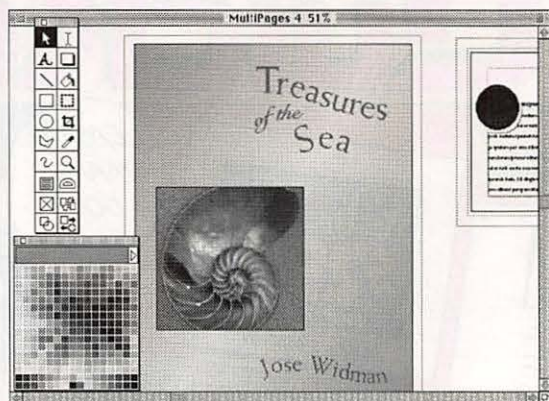
slick features that PageMaker and QuarkXPress should have incorporated a long time ago. But its failure to build on their successes could relegate Renaissance to the Dark Ages of desktop publishing.

Renaissance is positioned as a sketching tool for designers who are creating short documents such as ads or brochures. The program enables you to make quick adjustments to display text, lets you freely rotate text and graphics, and offers a full palette of drawing tools. Instead of having a pasteboard like PageMaker's, which limits you to a single page (or two similar pages), Renaissance lets you create and view several pages of different sizes simultaneously on a pasteboard that grows to accommodate them. You can move these pages around, and cut and copy them as easily as you would objects on a page. This is a great way to view short documents, but you'd never use Renaissance to lay out a book; moving from page 1 to page 60, say, would be a major effort, and Renaissance offers no indexing or chapter linking. Neither does it support master pages, automatic page numbering, or autoflow of text from page to page, all of which can be useful even in short multi-page documents.

Renaissance has several features that the page-layout leaders would do well to study. Nonprinting page guides designate margins, bleeds, and "extra"—the space allotted for notes, crop marks, and registration marks. An Element dialog box lets you resize objects proportionally, lock them, make them invisible, or make text automatically wrap around them; you can even attach a note.

Renaissance offers powerful (but far from intuitive) relational control over how objects in a group change when the group itself is resized or moved. For example, you can stretch grouped elements proportionally, maintaining their relative positions, or equally, which resizes the objects but not the spaces between them. You can even specify different horizontal and vertical control factors.

On the other hand, Renaissance blatantly ignores some of the most common Mac conventions. There is no keyboard shortcut or menu selection to select all objects on the page; you must zoom out to full-page view and use the pointer tool. Also missing are keyboard shortcuts for bold, italic, and underlined text, and for centering or justifying text. The shift key does not constrain moved objects at a 45-



Flexible Fliers Renaissance can easily create graduated fills and text on a path. A single document can contain varied page sizes.

or 90-degree angle. There's no grabber-hand shortcut to move the page around on screen. And so on.

Tooling Around

LIKE THE REST OF THE PROGRAM, Renaissance's 20-tool palette combines a strange mixture of power and oversight. The palette itself is nowhere to be seen when you open a document—you must first tear it off the menu. The drawing tools are powerful, but the screen stubbornly refuses to scroll if you attempt to draw beyond the window's edge. The Curve tool (similar to the freehand tool in draw programs) is a welcome inclusion, but it's also limited. You can't use the free-form tool to create filled curvilinear shapes; editing Bézier curves is both slower and clumsier than in either Aldus Free-Hand or Adobe Illustrator (you see the results of your edit only after you release the mouse button), and you can't alter the control points.

The powerful alignment tool requires careful reading of the manual and a bit of practice (don't be thrown off by the mysterious cursor transformations). Elements rotate easily and intuitively, although you can't rotate objects independently from their borders, as you can in QuarkXPress. Rounding out the toolbox are a drop-shadow tool and a paint bucket, which fills objects with custom gradients. Both are easy to use and real time-savers.

Two Types of Type

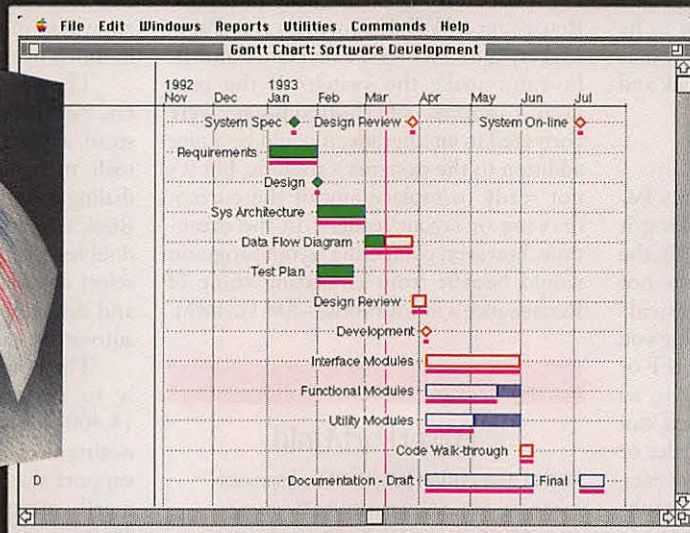
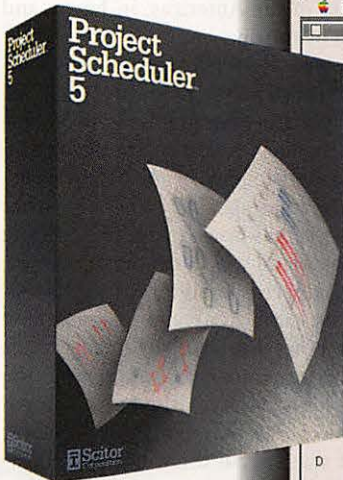
RENAISSANCE OFFERS SEPARATE TOOLS for creating display type and text type, a distinction that works nicely. Display type, although limited to one line, can be rapidly resized, skewed, and tracked. You can bind type to any object, a feature that is smoothly implemented; for example, you can edit text as it sits on a curve.

Working with body text is more problem-ridden. No matter how many spaces

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you insert after a word, the cursor refuses to budge from the end of the last-typed word. Letterspacing and hyphenation are powerful but quirky; for example, the program broke 6:30PM after the colon. Wrapping text around an object takes a little practice, and you can't alter the wrap border as you can in PageMaker and QuarkXPress.

The story editor, obviously copied from PageMaker, is a welcome feature. Unfortunately, you can't apply styles there; and worse, the program has no spelling checker or search-and-replace capabilities. Renaissance doesn't support TrueType, Type 3 PostScript, or Multiple Master fonts. However, the program's Styles feature is as comprehensive as its competitors', and laying in dummy text as a placeholder is a comparatively quick and simple procedure.

Pictures and More

OVERALL, RENAISSANCE HANDLES IMPORTED GRAPHICS with aplomb, making it easy for you to crop and scale to attain the desired image. The program does not support image control, but does provide excellent masking features that enable you to cut out unwanted portions of a TIFF or PICT image without first running to an image-manipulation program. Text can wrap around either the original border or the masked image. There are caveats, though. You cannot imbed inline graphics within text, and Renaissance cannot read TIFF files that have been compressed in the LZW format. According to Kodak, a future release will allow direct importation of its soon-to-be-released Photo CD format.

One of Renaissance's most powerful features is Libraries. You can save graphics, styles, page templates (complete with styled dummy text blocks), and custom color palettes. Editing each of the libraries is a simple procedure.

Color handling and printing with Renaissance are a mixed bag. While it's a treat to quickly drag colors from the floating palette and apply them to objects, the program doesn't let you use this procedure to colorize imported gray-scale images. You can specify a Pantone color as fast as you can type its ID number; unfortunately, that feature is hidden at the end of a series of four dialog boxes. Renaissance offers excellent printing control for knockouts, overprinting, and spot or process colors; yet attempting to print separations of imported color images from within the program proved frustrating; to print anything other than a CMYK image saved in EPS format, I needed to use a separation utility. Finally, the program has a limited number of PPDs, which makes

it a bit confusing to print screens other than the default screens offered.

Not Much Help

DOCUMENTATION IS SKIMPY, AMATEURISHLY WRITTEN, and poorly indexed, especially when compared with the thoroughness of the Aldus and Quark manuals. Tech-support staff was friendly and returned most calls, but the person I spoke with seemed to know only slightly more than I did about the program. Finally, although Kodak claims the program runs on 5MB of RAM, you're better off upgrading to 8MB—the program's recommended RAM partition is over 3MB.

It's hard to envision a rosy future for Renaissance. Will designers loyal to PageMaker, QuarkXPress, FreeHand, and Illustrator make the switch? If the program's dozens of shortcomings were corrected in an upgrade, it could be a nice addition to the designer's toolbox, but it's not ready to replace any of the current drawing or layout leaders. In the meantime, however, competing layout programs would benefit from emulating some of Renaissance's innovations.—JIM SCHMAL

14,400-bps Data/Fax Modem for PowerBook

PowerPort/Gold

PROS: Built-in RJ-11 jack; V.42bis compression; good noise immunity; sophisticated fax management. **CONS:** May not work with some overseas phone systems; may have problems in compression mode with some modems. **COMPANY:** Global Village Communications (415/390-8200). **REQUIRES:** Mac PowerBook. **LIST PRICE:** \$649.



GLOBAL VILLAGE COMMUNICATIONS has refined its PowerPort modem with the introduction of the new Bronze, Silver, and Gold models. The only distinction among the three is data speed: 14,400 bps for the Gold, 9600 bps for the Silver, and 2400 bps for the Bronze. All three send and receive faxes at 9600 bps and use the same GlobalFax software now common to Global Village's entire line of fax/data modems.

The family supports fax send and receive, V.42, MNP and LAP-M error-correction protocols, and V.42bis and MNP Class 5 data compression. The manual includes clear, detailed instructions, with photos showing how to open a PowerBook and install the board. The procedure is not difficult, but if the PowerBook is still under warranty or AppleCare, an authorized dealer must install the modem.

Each of the new modems is completely contained on a single board. You simply plug in a standard RJ-11 phone plug and start communicating. The old PowerPort, which used an external adapter containing the actual phone jacks, has its graces, though, particularly for international travelers. First, the external adapter contains two phone jacks to enable you to connect a telephone to the same line as the computer. Second, you can use special adapters to meet the peculiar requirements of some overseas telephone systems. Global Village continues to sell the original PowerPort and adapters for users needing these features. The new built-in RJ-11 jack, however, works anywhere in the Americas, in Japan, and in much of Europe.

The new PowerPorts have no speakers, external switches, or status lights. Instead, a miniature bar graph in the Macintosh menu bar reports data flow, and dialing sounds come through the PowerBook's built-in speaker. The status bar doubles as a pull-down menu that lets you select command mode; originate, answer, and disconnect operations; as well as set auto-answer and data-compression modes.

The PowerPort/Gold connects readily to remote modems supporting the 14,400-bps data rate, although it's worth noting that few commercial services now support that speed; the capability is primarily useful for connecting to another Mac for use with AppleTalk Remote Access. However, operating at slower speeds can be tricky. While no problems result at speeds up to 9600 bps with data compression disabled, turning compression on makes slower-speed connections more difficult. With compression enabled, the PowerPort/Gold always starts communicating at 14,400 bps, expecting the remote modem to negotiate a lower rate. If the remote modem's top speed is from 2400 bps to 9600 bps, though, the remote modem may not reliably continue the negotiations, resulting in a disconnect. Global Village's just-released software seems to have improved the situation, and you can always disable compression to get a reliable (if slower) connection.

You send a fax by holding down the option key and selecting Fax from the Print menu. The resulting dialog box lets you choose destination addresses from a built-in telephone directory, and then select image quality, cover-page style, and a time to schedule the transmission, which occurs in the background while you continue working. A status bar reports progress, and the modem tries connecting again in the event of a busy signal, no answer, or a disconnect. You can choose to

continues

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receive faxes manually or automatically—with or without PowerBook wake-up—and set to print them as they arrive or later. The stand-alone FaxCenter application lets you view and print received faxes, and uses a drag-and-drop interface for scheduling, enveloping (combining several faxes), or forwarding. An activity log tracks every fax transmission and any transmission errors that occur.

With the new GlobalFax software, you have an opportunity when rescheduling a fax to change the cover-page message, even if you've used the envelope feature to combine several faxes. The new software also gives you more control over the format of custom cover pages than was possible before. Finally, a new alert box requests confirmation when you drag faxes to the FaxCenter's trash can. One irritating gremlin remains: if a fax fails partway through transmission, you can't resume with the first missing page, but instead must send the entire document over again.

The PowerPort/Gold's improved software (which also works with the old PowerPort modem) and improved packaging raise the bar for PowerBook modem standards. If you need 14,400-bps throughput, the PowerPort/Gold is a champ. It's a pricey advantage, though, compared with its nearly-as-fast Silver sibling, which runs \$200 cheaper. But that's a race you'll have to judge for yourself.

—MEL BECKMAN

Architectural CAD Software

AutoCAD Release 11

PROS: Very customizable; supports AutoLISP programming; good networking and file sharing with other AutoCAD platforms; accurate solids modeling. **CONS:** Expensive; RAM intensive; 68020- and 68030-based Macs require acceleration; little third-party support. **COMPANY:** Autodesk (415/332-2344). **REQUIRES:** Mac II with math coprocessor; 5MB of RAM (8MB for System 7; 16MB for optional AME module); hard drive; System 6.0.5 (System 7 for AME); 32-bit QuickDraw. **LIST PRICE:** \$3500; AME \$495.



AUTODESK'S FIRST ENTRY INTO the Macintosh CAD market was AutoCAD Release 10 for the Mac. Essentially a port from the DOS world, Release 10 didn't exactly take the Macintosh world by storm. Instead of giving the Mac version of AutoCAD a graphical user interface, Autodesk required users to conform to the DOS version's command-line interface. Macintosh users voted with

their pocketbooks—end of that story.

Release 11 for the Mac represents a change of direction for Autodesk's porting strategy. Icons, pull-down menus, and dialog boxes are in; the command line is on thin ice, though still in evidence, and is fading in importance. It's tempting to credit Macintosh for the change, but it's more likely that Microsoft Windows made Autodesk jump on the graphical user interface (GUI) bandwagon.

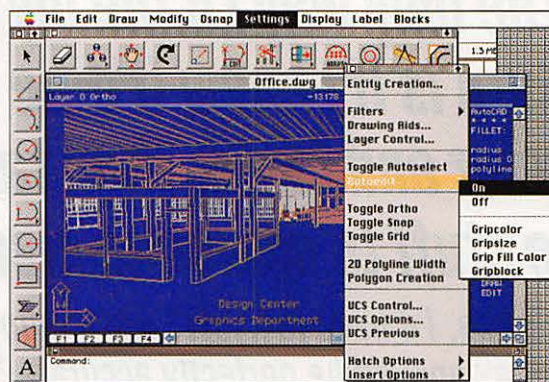
Unfortunately, Release 11 for the Mac is not the full implementation of the GUI that Release 12—currently available only for the DOS platform—is. In fact, Release 12 for DOS is what AutoCAD Release 11 for the Mac should have been. Partly as a result, many third-party developers are ignoring Release 11 for the Mac, concentrating instead on adapting their products for Release 12. Since one of the strongest arguments for using AutoCAD is the wealth of third-party add-ons, developers' hesitancy to develop for Release 11 for the Mac is a serious drawback.

So What's New?

LONGTIME MACINTOSH USERS WILL find many of AutoCAD's new capabilities old hat, and DOS die-hards may think these features are fluff, but they do make AutoCAD much easier to learn.

The command-line interface is still there, but you can also use pop-up menus, icons, and dialog boxes to enter commands. Control-key (not ⌘-key) keyboard commands are consistent with the DOS version. AutoCAD Release 11 also includes an improved implementation of tear-off palettes, with well-designed icons that tear off from the Draw and Modify menus. You can rotate the palettes from a vertical to a horizontal layout with a mouse click and have pop-up submenus. AutoCAD now supports the Mac's Clipboard; you can cut and paste selected items from an AutoCAD drawing to the Scrapbook or to another drawing without sacrificing accuracy.

Release 11's best new features are Autoselect and Autoedit—essentially an implementation of familiar Macintosh drawing capabilities. Autoselect lets you select objects by clicking on them (shift-clicking to select more than one) or by holding down the ⌘ key and dragging a marquee around a group of items. Selected items display grips (Autodesk's term for handles) that enable the user to



Tear-Off Menu Palettes AutoCAD's new tear-off menus feature vertical or horizontal orientation with color icons and cascading hierarchical menus.

manipulate objects with the mouse or by applying a transformation command.

Release 11 for the Mac is binary-compatible with other platforms, so you can exchange drawings by trading floppy disks or over a network. Release 11 supports blocks (similar to library objects in other CAD programs) and external reference files, so that when you update an original block and its reference files, all drawings that use those files update automatically. This can be a real lifesaver for complex projects in workgroup settings.

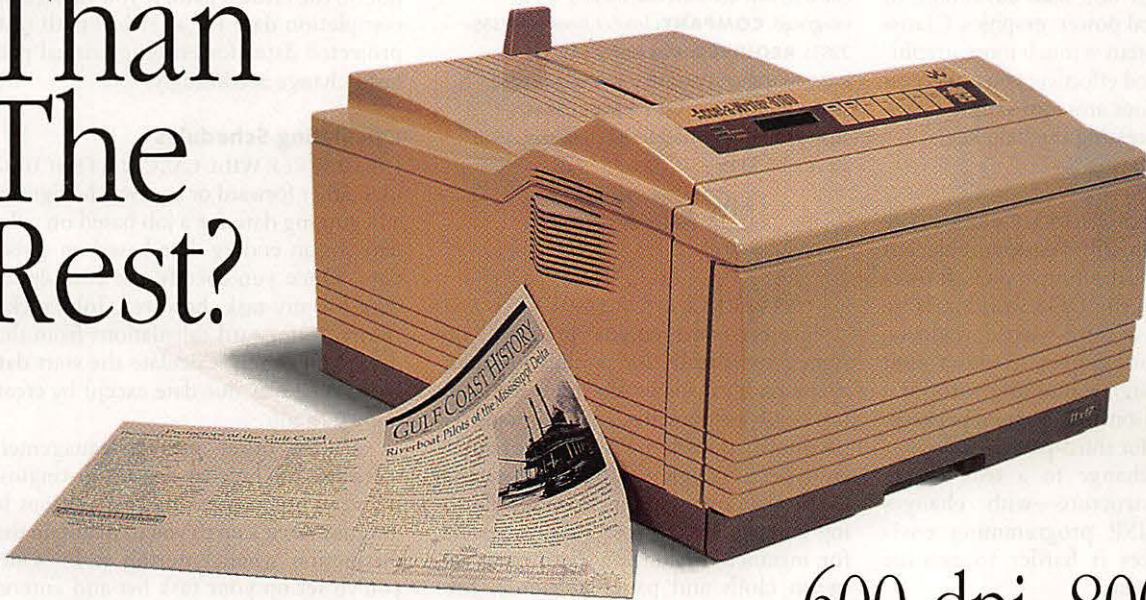
AutoCAD's Advanced Modeling Extension (AME), an optional application, uses 3-D primitives such as cubes, cylinders, and cones to provide solids modeling. You can create complex objects by using Boolean operators to join 3-D primitives, or by revolving or extruding profiles. AutoCAD's floating-point precision makes models created with AME extremely accurate, and you can export their properties (volume, mass, center of gravity, and so on) to a spreadsheet, statistics package, or engineering program for further analysis. AME can be an invaluable tool; but to be used effectively, it requires at least 16MB of RAM, System 7, and for all practical purposes, a Quadra or a 68040 accelerator.

Reading Up

AUTOCAD'S DOCUMENTATION WEIGHS in at a hefty 14 pounds—pages enough to cure a roomful of insomniacs—and unless you are a DOS-manual devotee, be prepared for acronym hell. Only the installation manual (118 pages out of a total of 1620 pages of documentation) is tailored for Macintosh users. For \$3500 a copy, I'd like documentation that doesn't assume DOS literacy on my part—isn't that why I first switched to the Mac? Autodesk assumes you have strong dealer support, which typically includes installation and some training. Take my advice, have the

continues

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600 dpi, 800 dpi,
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When shopping for an 11x17 PostScript® compatible printer, we realize you have a lot of choices. And while many vendors lay claim to being the best, Xante prefers to leave the judging to you. We invite you to compare our printer with the rest. With the *Accel-a-Writer 8100*, you'll get...

11x17/A3 Printing - The large page size support will give you a new level of flexibility in page layout and printing.

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Flexibility - Sharing among Mac® and PC users is simple with simultaneously active AppleTalk®, Parallel and Serial interfaces. You'll get font flexibility with 35 Type 1 fonts plus the ability to download up to 30 more permanently on the controller with Xante's *Virtual Disk Technology*.

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Standard Resolution	600x600 dpi	600x600 dpi	600x600 dpi	600x600 dpi
Optional Resolution	800x800 dpi 960x960 dpi	None	800x800 dpi	None
Standard RAM	12 MB	2 MB	12 MB	12 MB
Virtual Disk Technology	✖			
Enhanced Gray Scale	✖			
Price	\$3,995	\$3,995	\$5,495	\$4,595

Statistics as of 10/92

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Circle 1 on reader service card

dealer install the software; if something goes wrong with the installation—and it will—you don't want to have to rely on the manuals.

New to Release 11 is a HyperCard help stack, accessed from the Apple menu. While it is an improvement over the previous command-line help module, the help stack does not take advantage of HyperCard's real power: graphics. Claris-CAD's help system is much more graphically oriented and effective; you can access information about any tool simply by selecting it and pressing the help key.

Third Parties?

IT IS IMPORTANT TO REMEMBER THAT AutoCAD is primarily a customizable, but very bare-bones, drafting engine. It owes its leadership in the DOS world in large part to a legion of third-party developers. An architect, for example, wouldn't want to use it to design a building without a third-party add-on architectural package. Unfortunately for third-party developers, Release 11's change to a true three-dimensional structure—with changes to the AutoLISP programming environment—makes it harder to provide Macintosh add-ons.

I did speak with two third-party developers who are supporting Release 11. One is Eclipse Software, whose Architectural Power Tools, Release 11, provides an architectural environment for AutoCAD, as well as animated walk-throughs of buildings. The other developer is Radius, which provides the critical acceleration you'll need if you intend to use AutoCAD Release 11 on a Mac II, IIfx, or IIfx. Radius has developed both hardware and software acceleration solutions for Release 11 that will cure even the most severe case of Quadra envy.

Is It Ready for Prime Time?

FOR MOST ARCHITECTURAL AND ENGINEERING OFFICES, the principal reason to use AutoCAD Release 11 for the Mac is its compatibility with the DOS world, where AutoCAD dominates the CAD market and where it is strongly supported by diverse third-party offerings. It is a very powerful program, but it is also expensive in terms of initial software cost, hardware requirements, and learning curve—especially compared with other CAD applications for the Mac. Release 11 for the Mac demonstrates Autodesk's commitment to supporting the Mac platform and becoming a major player in the Macintosh CAD arena. But nothing will demonstrate its commitment to the Macintosh user like getting Release 12 for the Mac out the door as soon as possible.

—DANIEL M. GONZALES

Publication-Management Software

JobTracker 2.02

PROS: Excellent reports; calculates schedules forward and backward. **CONS:** Inelegant interface; limited to 50 tasks per job; can't add tasks after entering jobs; can't recalculate backward scheduling based on new due date; cost tracking not well integrated. **COMPANY:** InfoSolutions (814/355-2983). **REQUIRES:** Mac Plus; 2.5MB of RAM; hard drive; System 6.0.3. Recommended: SE/30; 4MB of RAM. **LIST PRICE:** \$844; 10 users \$6670; JobTracker Light (one user, 15 active jobs) \$395.



JOBTRACKER IS A SCHEDULING AND project-management program designed specifically for publication management. It calculates schedules and costs, tracks job assignments, and maintains status information on multiple jobs of different types. Though it's optimized as a tool for production managers in book publishing companies (the cost-analysis system, for instance, includes a distinction between cloth and paper editions), JobTracker is widely adaptable to a variety of publishing projects, from sales materials to newsletters.

Departments, Groups, and Tasks

YOU BEGIN YOUR SETUP OF JOBTRACKER by defining the departments (or people) who will be performing tasks. You might include the editor, copy editor, page-layout person, and art department; or you might be more specific and list people by name. Next, you define groups of jobs that have similar task lists—novels, illustrated how-to books, and textbooks, for instance.

The next step is to set up the task list for a group (see "Taken to Task"). This is where you name a task (copyediting, cover design, and so on), and set how long

it will take and who's responsible for it. This is also JobTracker's greatest failing; you can't have more than 50 tasks per job.

Like other project-management software, JobTracker uses the critical path method, so one task's start date can depend on the preceding task's completion date. You can specify that tasks are or are not on the critical path; if you change the completion date for a critical path task, projected dates for ensuing critical path tasks change accordingly.

Calculating Schedules

JOBTRACKER WILL CALCULATE SCHEDULES either forward or backward—figuring a beginning date for a job based on a due date, or an ending date based on a start date. Once you specify the completion date for any task, however, JobTracker resorts to forward calculations from that date. You can't recalculate the start date based on a new due date except by creating a new job.

Unlike other project-management software, JobTracker doesn't distinguish between milestones and tasks except by duration, so it's up to you to maintain that distinction when entering tasks. Once you've set up your task list and entered any jobs for a group, you can no longer add or delete tasks, though you can remove tasks from the job by making them nonrelevant. To create a job with a different task list, you need to create a new group (you can import the task list from another group and modify it, however).

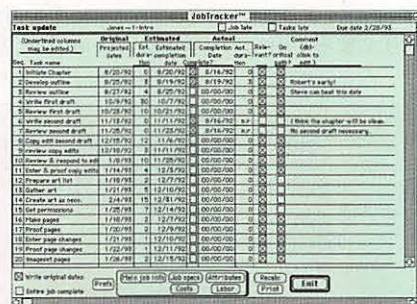
In addition to scheduling, you can enter cost data for jobs, and JobTracker keeps track of it and reports actual versus projected costs. This isn't automatically calculated from hours spent by different departments, people, and contractors, however, so it's more like a stand-alone data entry and reporting module than an integrated cost-manager.

JobTracker Reports

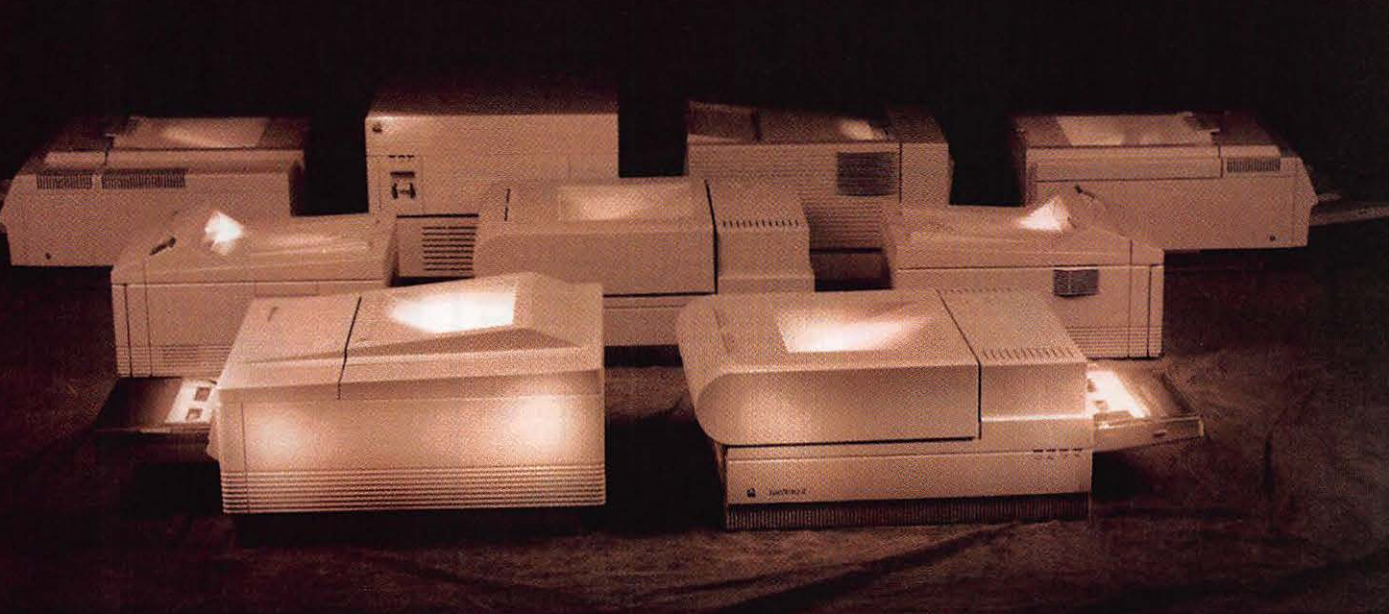
THE BEST THING ABOUT JOBTRACKER is the reports it provides. It doesn't do the fancy graphical Gantt charts that other project managers tout, but it provides much more useful textual reports than those programs: what's due from each department (or person) today or this week, what jobs are behind schedule, the status of all active jobs (what tasks have been completed, actual versus estimated dates, and so on), and costs for all completed jobs, among others.

Built in ACIUS's 4th Dimension (run-time version included), JobTracker doesn't show quite the polish that you'd expect from a program written in a lower-level language, but it manages its job com-

continues



Taken to Task The Task Update dialog box is the heart of JobTracker. Here it's set up to track a single chapter in a book. It could also be set up to track a whole book, one issue of a serial, or a single brochure in a series of marketing materials.



Deep Inside Your Old LaserWriter Lurks A 600 x 600 dpi Superprinter

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In addition to the 35 resident fonts, Xante's own *Virtual Disk Technology* allows you to permanently store up to 30 more download fonts directly on the controller. You will also be able to change the fonts stored depending upon specific job requirements. For those of you who want to store more than 30 fonts,

the *Accel-a-Writer* also includes a SCSI port for an external hard drive.

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RISC Processor	✖	✓ NTR	✓ Illsi
Standard 6MB RAM	✖		
Simultaneous Interfacing (AppleTalk®, serial, parallel)	✖		

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Statistics as of 9/92



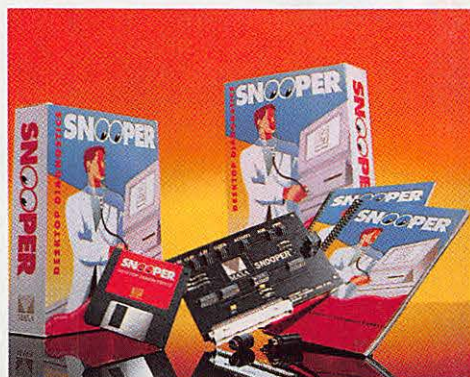
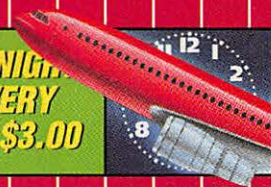
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Snooper Kit

⑦ Snooper provides truly comprehensive system diagnostic capabilities—everything from power supply and system clock, to the serial, modem and ADB ports are covered. Snooper detects hardware problems and sources of intermittent failures. It performs over 60 major component tests, prints the results, and logs errors. It also does benchmark testing and reports on system configurations to allow technicians to find and fix problems quickly. Includes a NuBus card to check errors even when the screen displays a "Sad Mac."
Publisher: MAXA UT10277

\$159

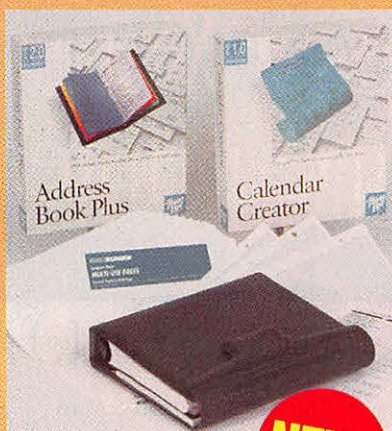


Morph™

⑦ The hottest image effect of the nineties is now available on the Macintosh! Morph™ smoothly transforms one image into another, creating dazzling images and effects. Whether it is last year's car model turning into this year's, or a futuristic cyborg villain disguising itself as the valiant heroine, this effect has astounded audiences all over the world. Morph™ is fast, easy-to-use, and is also QuickTime-savvy and System 7 savvy™. Publisher: Gryphon Software GRA0378

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PowerRunner™

⑦ PowerRunner combines Power Up's popular Calendar Creator™ and Address Book Plus™ software with the best-selling Day Runner® personal organizer. Calendar Creator handles everything from appointments to repeating meetings and holidays. Print your calendars in any format, from daily to yearly, then insert in your Day Runner binder. Address Book Plus produces top-quality address book pages, mailing labels, rotary file cards, envelopes, and unique InstaBooks™. Print double-sided address pages to fit Day Runner and other popular organizers. PowerRunners complete Day Runner Classic Edition 3-ring binder houses convenient 5 1/2" x 8 1/2" pages and includes a 45-page refill pack of sheet-fed paper for laser printers.
Publisher: Power Up! Software

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⑦ VocabuLearn/ce® now available in three levels and Compact Disc. Expand your vocabulary base with thousands of new words and phrases! VocabuLearn/ce \$35ea. Compact Disc \$69ea. Full line available.



⑦ PICTURE IT!™ A highly interactive "bilingual" approach to a foreign language dictionary...Designed for beginning students, yet a perfect learning tool for everyone. Offers a simplified user interface, 8 megs of native pronunciation, over 1000 entries depicted with high resolution graphics. Expandable resource file for customizing word lists.
Publisher: Penton Overseas
Full line available.

\$42ea.*

WristSaver Mini-MousePad



The WristSaver Mousepad's success prompted the WristSaver Mini-Mousepad. At only 5" wide x 8.5" long it is 3" smaller than the original. This is ideal for people who don't have room for a standard size pad. It works well because of the built-in

wrist support that raises your wrist about 1" off the desk surface. Your precious desk space is saved and your wrists will thank you. Manufacturer: LB Innovators

ACC0757: Navy
ACC0760: Gray
ACC0759: Black
ACC0758: Red

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⑦ New! Animated business simulation game challenges you to build and run your own business under authentic economic conditions. Experience the challenge of business, scandals, fires, terrorists, and more, as you battle for billions—or bankruptcy. Make crucial business decisions every minute, and enjoy the results—or suffer the consequences. Packed with sound, animation, and fun, it draws rave reviews from would-be entrepreneurs of all ages. Capitalist Pig is the must-have "Game of the Year". You never knew business could be so stimulating! Publisher: Pluma Software ENT0447



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⑦ Stuffit Deluxe 3.0 is the "Complete Compression solution". Only Stuffit Deluxe 3.0 can solve all your compression needs from archiving to transparent compression and includes Stuffit SpaceSaver. Stuffit Deluxe 3.0 is the fastest most efficient compression product available. Our new Add Match intelligently stuffs only the files that meet the criteria that you specify. UT10302 \$69.

Stuffit SpaceSaver

⑦ Unlike other compression products, Stuffit SpaceSaver increases disk space (with lightning speed) without effort on your part. Have it work while your Mac is idle or when you say "Compress this for me." SpaceSaver provides complete on-the-fly compression in one package. SpaceSaver is also one of the least expensive, most productive and easiest to use compression products available.

Publisher: Aladdin Systems, Inc. UT10303

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FREE POWER!

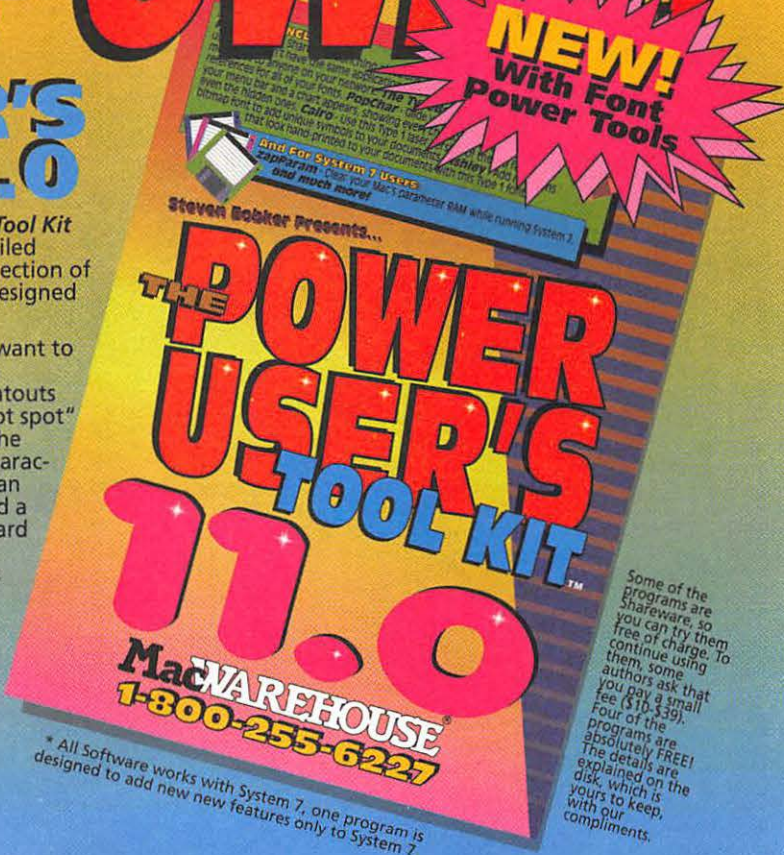
POWER USER'S TOOL KIT 11.0

Steven Bobker has stuffed version 11.0 of *The Power User's Tool Kit* with productivity enhancers and handy font software. Compiled exclusively for MacWAREHOUSE customers, this valuable collection of seven programs and fonts includes one program especially designed for System 7 users*.

Here's what awaits you -- *The TypeBook* is invaluable if you want to create hard-copy references for your fonts. *Print2PICT* makes self-launching "postcards" that are formatted electronic printouts from almost any application on the Mac. *PopChar* adds a "hot spot" to your menu that will show a chart of all the characters in the current font -- great for finding and pasting those hidden characters. *Cairo* and *Ashley* are Type 1 PostScript fonts that bring an old symbol bitmap favorite into the laser age and let you add a personal touch to your documents with notations that are hard to distinguish from hand printing. *Announce* sends instant messages to other users on your network, and *zapParam* lets you zap your parameter RAM under System 7.

The Power User's Tool Kit 11.0

is FREE when you order from MacWAREHOUSE. You pay only \$1.50 for shipping and handling. If you would like the disk, please ask for Item #AAA0028.



* All Software works with System 7, one program is designed to add new new features only to System 7.



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\$49

Kaboom!

Add more than 150 wild and wacky sounds to your Macintosh with Kaboom! Each sound can be played every time you start up your computer, insert a disk, empty the trash, and more! Amaze your friends with the sounds of traffic jams, screams, and ringing phones-even famous dialogue from "Twilight Zone," "I Love Lucy," Ronald Reagan, and more! With Kaboom! you'll never have to settle for a simple "beep" again! A great gift idea! Publisher: Nova Development Corporation UT10281



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Watercolor, and Charcoal, with thousands of customizable variations. Works in four different ways: Stand-alone application, Desk Accessory, Plug-In Filters (works directly with PhotoShop, SuperPaint, and others), and Animator (for applying effects to PICS animations)

Publisher:
Aldus GRA0279

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Word Torture: Spanish, French, German, Russian/ea	35
MCCA	
ENT0381 The Oregon Trail	29
Number Munchers or Word Munchers	ea. 19
Nordic Software	
EDU0276 Word Search Deluxe	35
EDU0142 Preschool Pack 2.0	35
Opcode Systems, Inc.	
MUS0107 Audioshop	65
Optimum Research, Inc.	
EDU0355 Stickybear's Reading Room	35
Passport Designs, Inc.	
MUS0049 Encore 2.5	379
MUS0059 MusicTime for Mac	169
Penton Overseas (Full line available)	
Picture II Level I: Spanish, German, French, Italian, ea.	42
VocabuLearn/Level I, II or III: French, German, Hebrew, Italian, Japanese, Russian or Spanish	ea. 35
Personal Training Sys. (Full line available)	
Excel 4.0, Word 5.0, Quark XPress 3.1	ea. 49
Pluma Software	
ENT0447 Capitalist Pig 1.1	35
Software ToolWorks	
MUS0082 Miracle Piano	349
XOR Corporation	
ENT0274 MacPaint Classic 1.1	52
Zondervan Publishing House	
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BOK0021 MacBible: King James Version	79

FONTS & APPLICATIONS

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● FON0295 Adobe Type Reunion		41
● FON0439 Adobe TypeStyler 2.0 w/ATM		127
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FON0438 Postscript Display Typefaces		95
Softkey Software		
● FON0480 KeyFonts		49
Wayzata Technology		
● FON0484 Font Fun House CDROM		35

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Apple Computer, Inc.	
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Broderbund	
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GRA0278 Virtus WalkThrough 1.11	309.
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Kensington

INP0231 Turbo Mouse (SE or II) 4.0	105.
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INP0246 Microtek ScanMaker II	959.
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Microtouch

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Mouse Systems

INP0132 Little Mouse ADB	74.
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INP0199 A3 Trackball	85.

Sophisticated Circuits

ACC0535 PowerKey 2.0w/ QuickKeys Lite	75.
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INP0116 LightningScan 400	359.
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UPGRADES & ACCELERATORS

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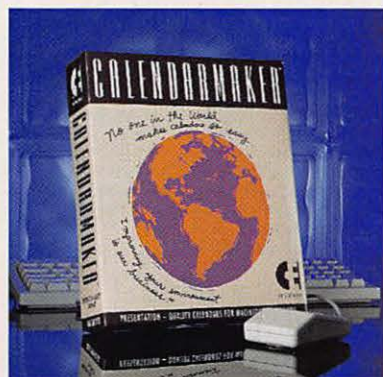


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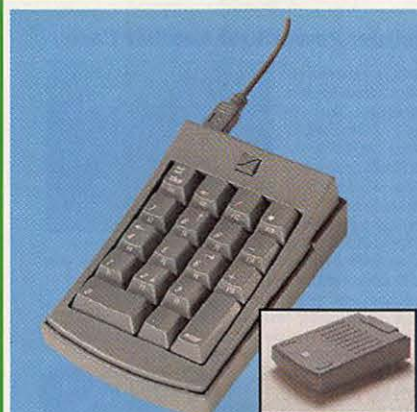
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CE SOFTWARE



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PowerPad INP0232



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Publisher:
XOR Corporation
ENT0330

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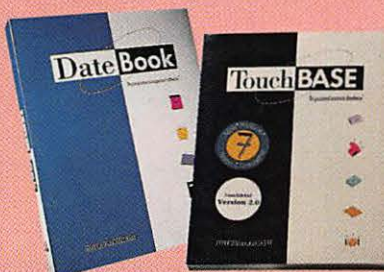
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Publisher:
Insignia Solutions UTI0174



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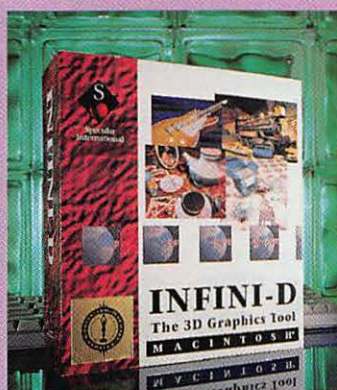
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Publisher: MicroMat UT10285



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Publisher: Specular International GRA0303

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\$149

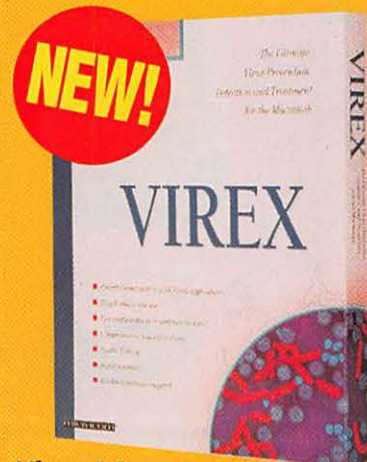
Stickybear's Reading Room

Stickybear's Reading Room makes reading fun for kids from four to eight. This bilingual learning application lets kids switch between English and Spanish at any time. Reading Room uses zany sound effects, stimulating graphics, and verbal reinforcement to entertain and stimulate children as they learn. For example, in the Word Bop game, a special toy cannon "bops" pictures into words, then back into pictures. In Sentence Builder game, Reading Room reinforces and builds reading ability by animating the sentences kids create.

Publisher: Optimum Resource, Inc. EDU0355



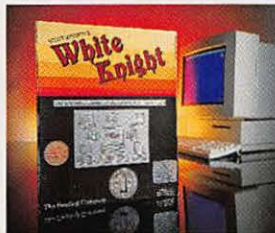
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White Knight V.11

The perfect low-cost solution to almost any Mac telecommunicator's needs. Offers the kind of power associated with

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2 1/2 MB	Remove only two 256k SIMMs, install two 1 MB SIMMs.
4 MB	Replace all four 256k SIMMs with four 1 MB SIMMs.
To upgrade a 2-socket Mac Classic II or LC to this amount of memory	Do this: (Install in multiples of two only) SIMMs must be 100ns or faster
4 MB	Install two 1 MB SIMMs
To upgrade a 2-socket Mac LC II to this amount of memory	Do this: (Install in multiples of two only) SIMMs must be 100ns or faster
6 MB	Install two 1 MB SIMMs
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5 MB	Keep existing 256k SIMMs, install four 1 MB in remaining sockets.
8 MB	Remove all four 256k SIMMs, install eight 1 MB SIMMs
To upgrade a 4-socket Mac IIsi to this amount of memory	Do this: (Install in multiples of four only) SIMMs must be 100ns or faster
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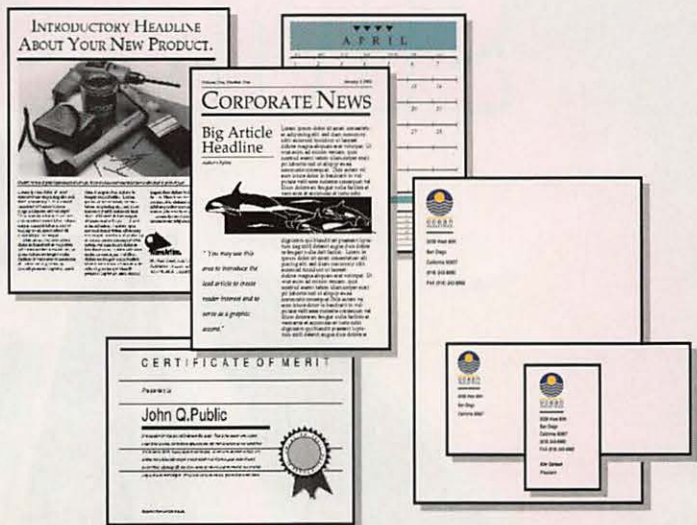
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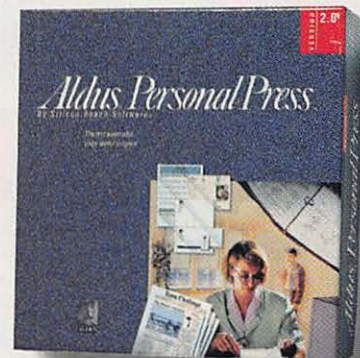
DTP 0080 FaxFACTS 2502

Publisher: Aldus

Suggested Retail: \$199

System requirements: Mac Plus or higher (including PowerBook family and Quadra); System 6.0.3 or later (6.0.5 or later recommended); 1 MB RAM (2 MB recommended); hard disk drive.

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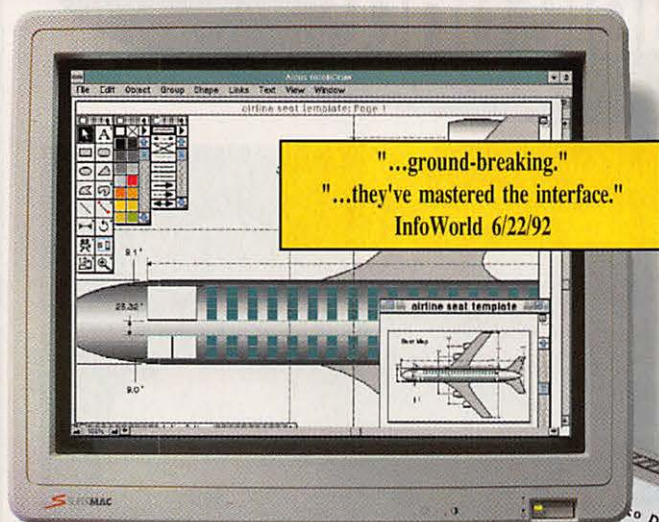


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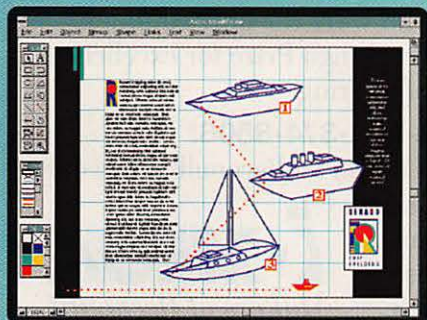


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InfoWorld 6/22/92

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Publisher: Aldus

Suggested Retail: \$299

\$199

Recommended system requirements: Mac SE/30 or higher; 4 MB RAM; System 7 or later; hard disk drive; Adobe Type Manager 2.0 or later.

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petently despite a lot of jumping between different screens. A demo version with some capabilities disabled is available from InfoSolutions for \$25.

JobTracker is not the project manager of my dreams, but it gets a lot closer than any of the half dozen management databases I've built over the years when trying to coordinate publishing schedules. Every production-management organization is different, but based on the excellent reporting alone, if you manage multiple publications I strongly recommend ordering the demo version and spending the hours it will take to see if JobTracker works for you.—STEVE ROTH

Grade-Book Programs

Grade Machine 5.0

PROS: Easy to use; report styles adaptable to any grade level; network capability. **CONS:** Disk must be sent to company for personalization. **COMPANY:** Misty City Software (206/828-3107). **REQUIRES:** Mac Plus; System 6.0.3. **LIST PRICE:** \$79; with Classroom Attendance option \$99; site licenses available.



Making the Grade 2.0

PROS: Easy to use; can print standard reports in Spanish; free upgrades on AppleLink. **CONS:** Copy protected; no network capability; manual lacks index. **COMPANY:** Jay Klein Productions (719/591-9815). **REQUIRES:** Mac Plus; System 6.0.3; second disk drive. **LIST PRICE:** \$99.95; volume discounts and school packs available.



FOR A TEACHER, ONE OF THE BENEFITS of having a computer is being able to automate the grade book. You could use a spreadsheet or database to record grades, but designing a comprehensive grade book takes time and expertise that most teachers just don't have. Grade Machine and Making the Grade, both developed by high school teachers, help you quickly set up electronic grade-books that print useful reports.

Grade Machine

VERSION 5.0 OF GRADE MACHINE refines the capabilities of previous versions, including adding flexibility to entering grades and printing reports. On screen, the grade book appears as four spreadsheet-style windows: Students, Scores, Assignments, and Summary (which lists students' cumulative points with percentages and letter grades for each grading

period). Anyone familiar with spreadsheet software can use Grade Machine without much difficulty. The manual is clear and concise—a quick read through the tutorial is all most users will need.

The program allows for ten grading categories, such as lab, homework, quizzes, and tests. A Grade Options dialog box lets you specify whether grades should be entered and displayed as points, percentages, or letters; and you can choose a grade-rounding scheme. You can also weight individual assignments, assignment categories, and grading periods. Grades can be scaled for mainstreamed special-education students.

Most of the setup work is finished when you've entered names, identification numbers, sex, and other miscellaneous data into the Students window. You can create up to 36 numbered comments and include these comments in letters to parents and in each student's record and progress reports.

Individual progress reports show each student's assignments, scores, and special comments. You can also print group reports for bulletin-board posting that show student assignments and grades with confidential ID numbers. Progress graphs display students' scores with line or bar charts; histograms show class score distributions, so students can see where they stand. You can even generate form letters that include individual student scores and your comments. Custom forms can be saved as templates and reused.

School districts and departments that have purchased a site license and have sent the disk to Misty City Software for "personalization" (a form of copy protection) can share a single copy of Grade Machine on a file server, with each teacher maintaining separate grade books. For classrooms equipped with Macs, the optional Classroom Attendance module is worth the additional \$29; you can quickly enter tardies or absences in the roll book or seating chart. The seating chart shows each student's name attached to a desk, which can be moved into any configuration; you can print the chart for substitute teachers or visiting administrators. Attendance records can be imported into progress reports.

Making the Grade

MAKING THE GRADE IS THE MACINTOSH version of the popular Apple II program Grade Busters 1/2/3. As with Grade Machine, the on-screen grade book looks like a spreadsheet with multiple windows. You can show assignments in as many as ten categories, and although you can enter grades only as points, you can display them as letters, percentages, or numerical

Grade Views Grade Machine and Making the Grade present grade-book data in slightly different forms, but both perform all the necessary grade-book functions and more.

values. All grades can be scaled for special-education students. The Teacher Aide function enables anyone to enter the grades but prevents people from tampering with student records.

Making the Grade offers dozens of options for printing reports, many modeled after traditional two-page spiral grade books. Class reports can include statistics for the group as well as for individuals, and confidential grade sheets can be printed for bulletin-board posting. A complete student report (called The Works) is several pages long, including a cover sheet, grading scale, assignments with grades, class rankings, graphs, and attendance pages. If this seems like overkill, you can create shorter reports.

The Daily Record enables you to record and display attendance information and comments. You can print this information for conferences or attach it to progress reports. Attendance data cannot be merged into the grade report.

Making the Grade is easy to learn. However, if you're already spreadsheet-literate, the friendly dialog boxes and helpful reminders may get in the way and slow you down. The three-ring manual is chatty, easy to read, and packed with illustrations, but its wordiness and lack of an index make it an awkward reference.

Final Grade

GRADE MACHINE AND MAKING THE GRADE have many features in common, and both are frequently revised and improved.

proved. Both import and export text and ASCII files, so you can move data back and forth between your grade book and your word processor, spreadsheet, or database. You can also transfer student information and assignments from one class to another and amend scores with your own comments.

Either program can save a teacher time, and since both come with a 30-day money-back guarantee, you might want to preview them to see which best matches your work style. Of the two current versions, we prefer Grade Machine because its interface is a little cleaner. Grade Machine also gets a nod for its networking capabilities, optional Classroom Attendance module with seating chart, and slightly less intrusive form of copy protection.—GEORGE BEEKMAN AND KAY STEPHENS

Network Connectivity

EtherPrint

PROS: Inexpensive solution for connecting single LocalTalk printer to Ethernet. **CONS:** Only supports printers; no management software; upgrades through ROM change only; no security; can't use LocalTalk routers. **COMPANY:** Dayna Communications (801/531-0600). **LIST PRICE:** \$499.



EtherPrint Plus

PROS: Connects up to four LocalTalk devices to Ethernet; serves as an inexpensive AppleTalk router. **CONS:** No management software; upgrades through ROM change only; no security; can't connect an additional router on AppleTalk zone. **COMPANY:** Dayna Communications (801/531-0600). **LIST PRICE:** \$649.



Ether Write

PROS: Connects up to six LocalTalk devices to Ethernet; serves as an inexpensive router; best price per port; good management software. **CONS:** LEDs can be confusing. **COMPANY:** Compatible Systems Corporation (303/444-9532). **LIST PRICE:** \$695.



MORE AND MORE, MACINTOSH networks are moving from LocalTalk to Ethernet. Ethernet offers faster performance; support for a larger network size; and better support for non-Macintosh systems, such as DOS PCs and workstations. But there are problems too: most

laser printers have no Ethernet port; and PowerBooks can't accept Ethernet boards, which makes connecting to Ethernet complicated and expensive.

Dayna Communications and Compatible Systems have developed some inexpensive "plug-and-play" solutions to the problem of connecting LocalTalk devices to Ethernet networks.

Installing the EtherPrint, EtherPrint Plus, or Ether Write is simple. You plug a LocalTalk device into a 6-by-8-inch box, attach the box to your Ethernet network, and turn on the box. LocalTalk printers are suddenly available to Ethernet Macintoshes.

Dayna's EtherPrint supports a single printer only. Compatible Systems' Ether Write and Dayna's EtherPrint Plus are more flexible. They handle multiple LocalTalk printers; systems; or peripherals, such as fax and network modems. The Ether Write supports six devices, and the EtherPrint Plus supports four. The EtherPrint Plus cannot be used with routing devices, but that shouldn't be much of a problem for most sites.

None of these boxes support protocol translation—they are AppleTalk-only products. If you need TCP/IP or some other non-AppleTalk protocol (such as Novell), you have to go with a more-expensive solution. All three have configurations to support thick, thin, and twisted-pair Ethernet, and all come with a one-year warranty.

All three products support both Phase 1 and Phase 2 AppleTalk. You can use DIP switches on the EtherPrint and EtherPrint Plus to select Phase 1 or Phase 2 operation. On the Ether Write, a switch allows the network manager to choose Phase 1, Phase 2, or Autoselect. Or the manager can use the Ether Write management software to override the DIP switch and lock in Phase 1 or Phase 2.

Both manufacturers provide management software. The EtherPrint and EtherPrint Plus management software is very simple: its only purpose is to let the network manager choose a Phase 2 AppleTalk zone for the box. The Ether Write software is a better management tool. It allows the manager to choose AppleTalk zones, allows password protection of the Ether Write, and gives performance statistics on the Ethernet and LocalTalk networks and on the Ether Write itself. The Ether Write software is stored in Flash ROM, which allows the network manager to update the product easily.

Only the Ether Write includes security software. Each Ether Write box has a password for controlling who can configure the Ether Write itself. A second level of security allows the administrator

to password protect each service (each printer or file system) connected to the Ether Write. To support this, each Mac on the Ethernet network must have the ENS cdev/INIT provided by Compatible Systems. Macintoshes that don't have ENS, or the password for a particular service, won't even see the services. Although this is cumbersome, it does work.

In my tests all three products had identical—and excellent—performance. Printing from a Mac on the Ethernet network to a LocalTalk printer was just as fast as from a LocalTalk Mac to a LocalTalk printer. Similarly, Macintosh file services weren't slowed down by connection to Ethernet. It's obvious that the LocalTalk network, much slower than Ethernet, is the bottleneck.

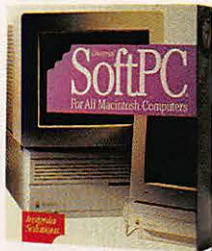
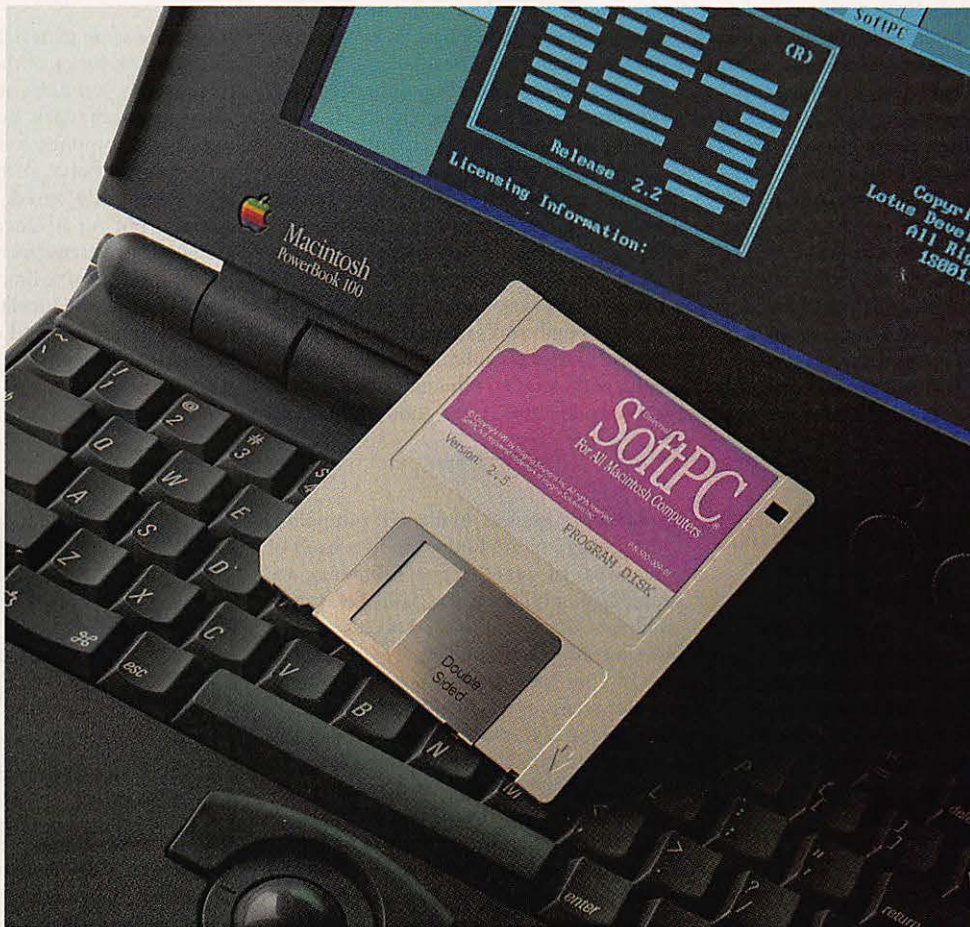
These "mini-router" devices have lots of applications. As Macintoshes move to Ethernet networks, one solution to the printing problem is to attach printers to minicomputers. Unfortunately, most minicomputers only support asynchronous connections, which slow down printing considerably. A case in point: a printer connected to a minicomputer server took about an hour to print an 8MB color PostScript file; a printer connected to one of the mini-routers took only 12 minutes to print the same file. For about \$100 a printer, both the Ether Write and the EtherPrint Plus can speed printing times substantially. And this is a lot cheaper than dedicating a Macintosh as an Ethernet/LocalTalk router, or spending thousands of dollars on a multiprotocol router.

PowerBooks can also use these mini-routers. For occasional uploading, downloading, and printing, the EtherPrint Plus and Ether Write are excellent. Cheaper than multiple SCSI-to-Ethernet adapters, both products allow PowerBook users to plug in, and operate with little or no fuss.

For multiple devices, I recommend the Ether Write over the EtherPrint Plus. The Ether Write is an elegant and cost-effective solution to a common problem, with excellent network-management capabilities. For about the same price, you get six devices, instead of the EtherPrint Plus's four, and you get better management, configuration, control, and security software. The Ether Write also has some nice extras: ten diagnostic LEDs to show Ethernet and LocalTalk traffic, and the ability to connect LocalTalk routers.

For a single printer, the EtherPrint is the least expensive. However, with a retail price of \$500, it may be difficult to justify buying the EtherPrint for a single printer; you should consider buying one of the multiport boxes instead. The cost difference is small for substantially greater expansion capability.—JOEL SNYDER

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MacBreadboard 1.1

PROS: Easy-to-use interface; good use of color; built-in chip library; minimal hardware requirements. **CONS:** Fixed breadboard size; can't expand chip library; limited set of sample labs. **COMPANY:** Yoeric Software (919/644-1620). **REQUIRES:** Mac 512KE. **LIST PRICE:** \$59.95.



FOR YEARS ELECTRICAL ENGINEERING students have learned to design digital circuits containing integrated circuit chips using a homely little device called an IC breadboard trainer. The typical trainer consists of a white plastic block containing hundreds of socketed holes; a power supply; and a few ancillary switches, indicator lamps, and buzzers mounted around the periphery of the block. Students plug chips into the holes, and then plug wires into other holes to connect the pins of the chips to other chips on the breadboard or to the peripheral switches and whatnot. Then the student throws the on switch and is rewarded with either expected results or a burned-out chip.

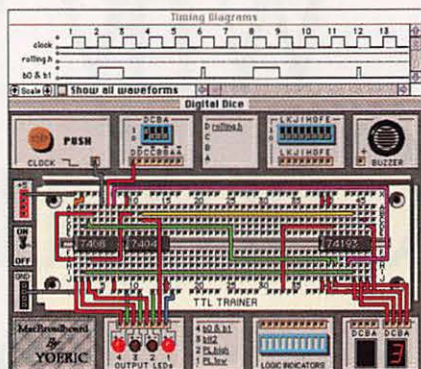
MacBreadboard simulates every aspect of these trainers. It displays, with uncanny fidelity, a full-color, three-dimensional rep-

lica, complete with power supply, assorted switches, LEDs, seven-segment readouts, a buzzer, and a variable-speed clock. You use the mouse to install chips from a library of 78 standard parts, dragging to make connections with wires. On a color Mac, wires of different lengths appear in different colors, as they do on real breadboards. You can turn on the juice at any time to see your circuit operate. The mouse pointer doubles as a logic probe, letting you test any circuit connection for voltage.

Circuits using the optional clock, which simply generates consecutive digital pulses at a rate you select, can display a timing diagram plotting state changes for all of the switches and indicators. Such diagrams are an indispensable tool for understanding circuit operation, and they have to be drawn by hand when using real breadboards. To help with debugging, MacBreadboard's Step mode lets you advance the clock one pulse at a time as you watch the circuit operate.

The board is large enough to accommodate five or six chips (depending on the number of pins), so you can build complex circuits. However, I was frustrated that I couldn't expand the working area when I wanted to add "just one more chip."

MacBreadboard's manual lacks an index but is otherwise complete, including an appendix with detailed schematics for each of the available chips. Very good online help



Virtual Breadboard In addition to actually running any circuit layout on the board, MacBreadboard generates timing diagrams for later analysis.

covers the same material as the manual, including schematics of the chip library. Unfortunately, you can't augment the library with more chip types. You're stuck with the ones Yoeric supplies: a selection of gate, inverter, shift register, arithmetic, and counter ICs commonly used for introductory courses, but no advanced devices such as memory or microprocessors.

In spite of some limitations, MacBreadboard is a useful educational device that accurately replicates and even surpasses the behavior of the physical tool it simulates. Except, of course, for the toasted chips. —MEL BECKMAN

Apple Menu Enhancer

Power Menus 1.0

PROS: Extremely simple; easy to use; fast; adds unlimited number of submenus to Apple menu; manual updating for PowerBook users. **CONS:** Cannot reorder Apple menu. **COMPANY:** Kiwi Software (805/685-4031). **REQUIRES:** Mac Plus; System 7. **LIST PRICE:** \$39.95.



I HATE CLUTTER. I'D LOVE TO HIDE all those things that cover my desk—the stapler, the tape, the paper clips, the extra pens and notepads—and I would if I didn't need to use them so often. Of course, I feel the same way about my Mac's desktop.

Power Menus is a simple little utility that adds flexibility to the Apple menu. It does basically just two things, but it does them well.

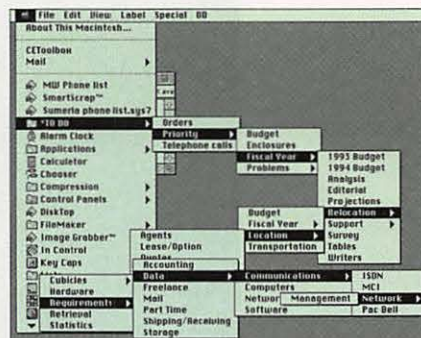
Most System 7 users have probably used aliases in their Apple menu to quickly access their most frequently used files or applications. Unfortunately, the menu can get unwieldy awfully fast. Power Menus adds submenus to the Apple menu. Other Apple menu utilities do the same thing, but the advantage of Power Menus is its DeepLevel accessing technology, which allows you to

display an unlimited number of submenus. Other programs are limited to five levels of submenus. In general, five submenus are probably plenty, but if you dislike clutter as much as I do, the unlimited access offered by Power Menus is wonderful. By placing an alias of your hard drive in the Apple menu, you can access every one of your files without opening a single window. And you can access them quickly. On my slow Mac II, Power Menus' submenus appear much faster than the actual windows do.

The other significant feature of Power Menus is its ability to change the font and size of the type in the Apple menu. If you're willing to read 9-point type, you can list dozens of files or applications. Of course, if you'd rather have 18-point type, that's an option as well. A condensed-font option enables you to squeeze more characters into the available space.

I'm not a PowerBook user (alas), but there is an option for those lucky souls that turns off automatic updating of the Apple menu. This lets sleeping hard drives remain in their unconscious state, saving time and battery power.

Power Menus does not allow you to reorder the Apple menu, although Kiwi does explain in the manual how you can insert extra characters in order to change the positioning of applications or documents. Micro-seeds' HAM, a competing Apple menu util-



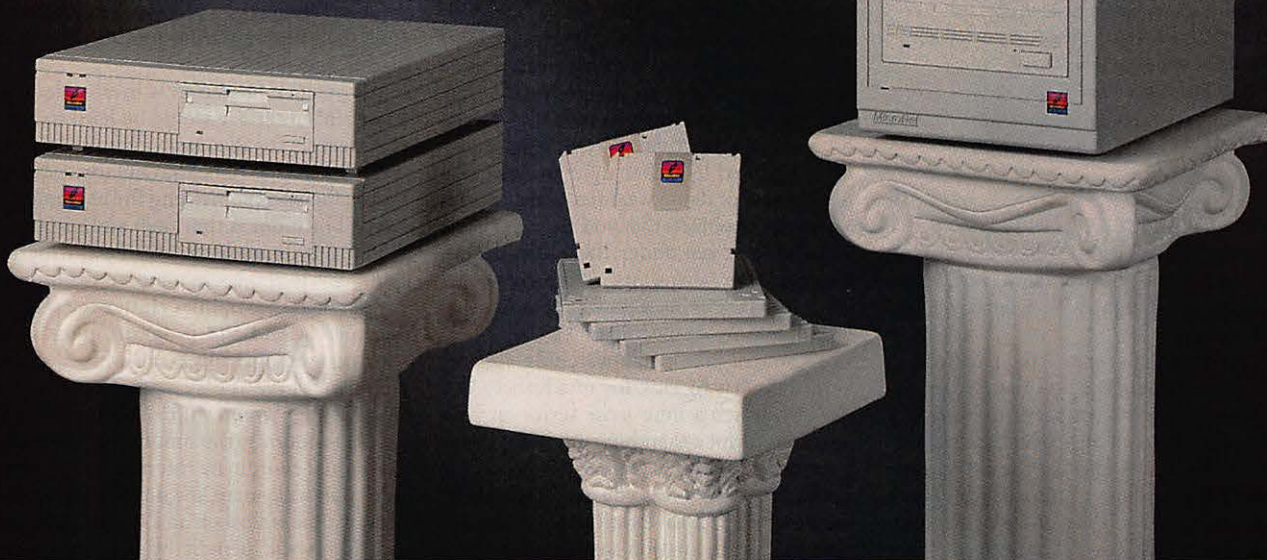
Menus and More Menus An unlimited number of submenus is a lot more than any sane person would want to see. This screen shot has submenus hidden behind submenus for a total of 11. Mousing my way through 11 menus took far less time than opening the equivalent windows would have.

ity, can't reveal more than five submenus but does allow you to reorder the items on the menu. Power Menus lacks that feature, but that isn't enough to dissuade me from Power Menus. Still, if you don't have files buried six, seven, or eight folders deep, you might want to think seriously about what it is that you're looking for in an Apple menu utility.

Power Menus excels in accessing submenus and has a couple of other nice features. Does that make it worth \$39.95? If you, too, hate having a cluttered desktop, the answer is yes. —WENDY SHARP

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Astronomy Software

Expert Astronomer

PROS: Great educational tool for beginners while useful to experts; killer value. **CONS:** Not as useful with black-and-white monitor; cluttered interface. **COMPANY:** Softsync (305/444-0080). **REQUIRES:** Mac Plus; 2MB of RAM; System 6.0.4; hard drive. **LIST PRICE:** \$49.95.



I'VE ALWAYS THOUGHT THE BEST risk-free way to escape the stresses of living in an industrialized society is to go out on a cold, clear night with a telescope and watch the sky.

The Mac can't replace the telescope as a tool for watching the sky, but Expert Astronomer makes it a lot easier to become a hobbyist stargazer. The product, most effective in color, draws maps of the sky and has a significant database of information about celestial objects such as planets, stars, comets, and other galaxies. The program succeeds well both as an educational aid for a rank beginner and as a useful reference tool for more-expert would-be Keplers who own a telescope.

You can draw (and print) a sky map of what you'd see in any angle and direction

from any location on Earth. You can click on any one of about 9000 celestial objects, and the program displays information on it.

You can pick a location (there are several hundred cities in the database, or you can specify any latitude and longitude on the planet) and get a map of the sky, with or without identifying labels. Because Expert Astronomer allows you to filter out objects according to magnitude (basically, visibility), you can tailor the map to reflect the environment of a particular place. If your visibility is blighted by either light from human settlements or damp weather, you can print a map of the objects that you are most likely to be able to see under those conditions. You can print "snapshots" of the sky (either white on black or black on white) facing specific directions at specific times.

You can plan a sky-watching session, knowing what to look for in advance. You can also watch a time-lapse series on your screen (or print a snapshot with lines) showing the paths objects "travel" in the sky, so as the evening evolves you can judge where stars and planets have moved to. Additionally, the documentation answers some basic science questions in a nine-page introduction to astronomy, a glossary of common terms, and descriptions of the constellations.

The more experienced astrophile will be able to use all the mapping features of Expert Astronomer and should find the large

database of information about celestial objects handy. What's more, ambitious users will enjoy the product's ability to leave the planet and make sky maps from any angle from virtually any spot in the Solar System. With that capability, you can track space missions and make good use of any pictures they send back, spotting and identifying all significant objects.

The documentation is invaluable. The program's interface would be hard to learn if it weren't for the clear, logically laid out Tutorial chapter. The introductory material makes the book something for beginners to keep. The index is thorough and usable.

The program is not designed with different levels of users in mind, so the features for advanced astrophiles clutter the way for beginners. And the program gives short shrift to users with black-and-white displays; they won't have as easy a time decoding the maps as they would with a color monitor.

Considering the amount of three-dimensional coordinate information required to redraw a sky map, it's not surprising that redraw time is slow on an LC. Users of low-end Macs will benefit by turning on the manual-redraw feature.

Expert Astronomer is a valuable and fun science tool, both educational for the beginner and stimulating for the expert. And it is a great value at \$49.95.

—JEFFREY GORDON ANGUS

Math Simulation Software

Simulink 1.2

PROS: Iconic programming of simulations in math, physics, and electronics; much faster than other icon-based systems; a superset of MATLAB. **CONS:** Minor bugs; still command-line oriented. **COMPANY:** The MathWorks (508/653-1415). **REQUIRES:** Mac Plus; 2MB of RAM; math coprocessor. **LIST PRICE:** \$3995.



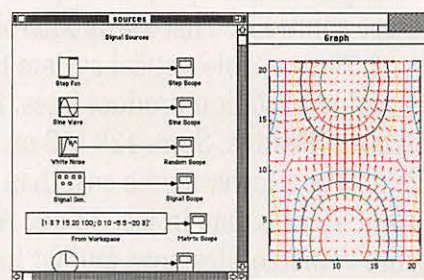
ONE OF THE FIRST USES FOR THE computer, way back in the 1940s, was matrix computation, since a matrix is an array of numbers upon which you perform arithmetic. And the matrix computations, way back then, were used to simulate the behavior of electronic networks, which is just one of the things that Simulink does today.

Simulink was developed by The MathWorks, best known for its program MATLAB—MATLAB runs on computers from Crays down to humble PCs. Classic MATLAB is an austere command-line-driven program, more like a specialized version of C than a Mac program (the current version of MATLAB has adapted successfully to Mac style). Simulink incorporates the company's experience in matrix software

and its applications—mainly digital signal processing, optimization, and control systems—but offers an easy-to-learn icon-based interface for designing simulations.

The term *simulation* in Simulink refers not to the kind of mechanical modeling you do in Interactive Physics II (also reviewed in this issue), where you watch objects moving around, but to situations that can be described by ordinary differential equations and for which the expected output is a graph. You can perform mechanical simulations as well, but without the moving pictures—and Simulink includes examples for open- and closed-loop linear and nonlinear modeling, an autopilot control system, and a variety of digital filters. The transfer functions that define the modeled system are all expressed as icons. Dialog boxes define the parameters for each icon, and mouse-clicks connect the icons in diagrams. A large assortment of icon operators similarly makes it easy to define sophisticated simulations in pictures. Simulink translates your design into matrices and scripts of function commands, called S-functions, which in turn can be saved as MATLAB M-files or as MEX-files for use in C or FORTRAN programs.

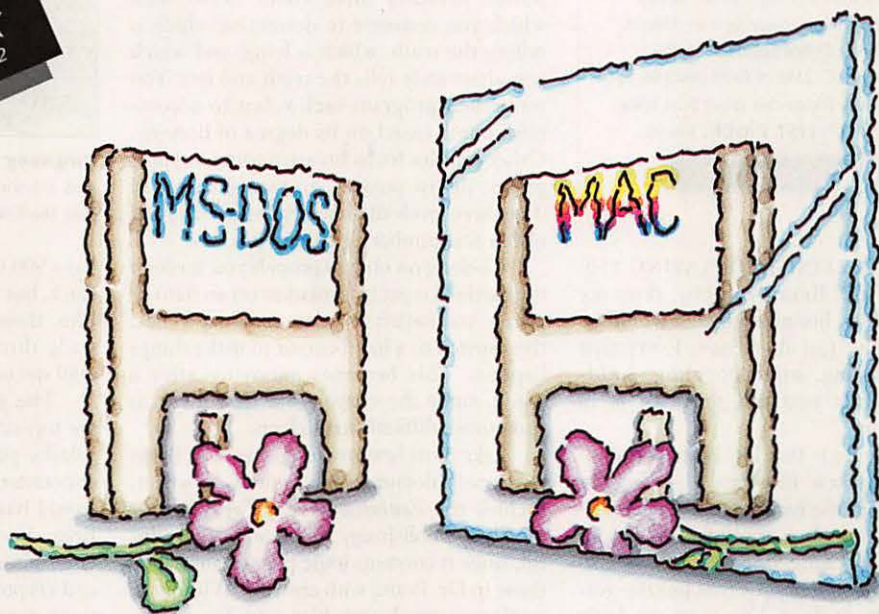
Other scientific software lets you program these functions in icons—National Instruments' LabView is the most popular example. The difference is that Simulink has a complete tool set for digital simulation,



Think Link Simulink's input functions are represented by icons, and the results are viewed in scope windows. The works of the simulation are block diagrams of operators, which Simulink internally translates into matrices in a special format.

and it's fast. If you hear the word *bode-plot* at work, Simulink is designed to make your life wonderful. The Mac interface is acceptable and in fact better than average by math software standards, but little glitches remain (the program doesn't quit when you choose Quit from the File menu; you must enter a Quit command at the >> prompt).

In practice you'll probably write models directly in MATLAB syntax, and for efficiency the program has a persistent bias toward programming-language, rather than icon-programming, models for simulation. But whereas *simulation* too often means an educational or toy program, Simulink is the industrial-strength real thing.—CHARLES SEITER



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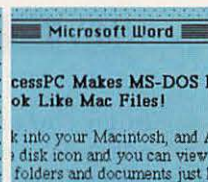
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Puzzle Collection

The Castle of Dr. Brain

PROS: Great color graphics and sound. **CONS:**

Requires color monitor and high-density floppy drive; some puzzles more annoying than difficult.

COMPANY: Sierra Online (209/683-4468).

REQUIRES: Mac LC; 2MB of RAM (4MB for System 7); high-density floppy-disk drive; 8-bit color monitor; System 6.0.7. **LIST PRICE:** \$49.95.



I'VE FINALLY FINISHED PLAYING THE Castle of Dr. Brain, and boy, does my head hurt. If my brain had lips, it would be saying, "Ouch!" just about now. Every type of brain-twisting, mind-boggling, head-spinning puzzle you can think of is in this collection.

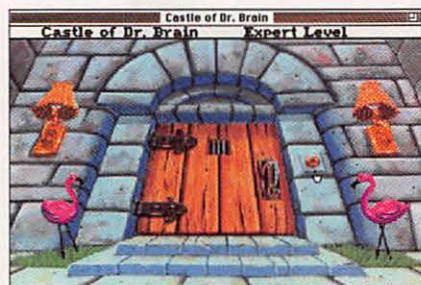
The premise is that Dr. Brain is the local, slightly askew Einstein who has just placed an ad in the local rag for a lab assistant. You're asked to apply for the job in person at the castle door, which is also where you encounter your first puzzle: getting in the front door. You must use logic and raw brain power to navigate a series of rooms, mazes, and hallways to reach Dr. Brain for your interview. When you finally reach him, you're rewarded with the job and

a brief tour of his computer room, and the game concludes.

The puzzles in The Castle of Dr. Brain range from simple and mundane (hangman) to creatively laborious. One challenging puzzle presents three robot heads with which you converse to determine which is telling the truth, which is lying, and which one alternately tells the truth and lies. You must then program each robot to accomplish a task based on its degree of honesty. Other puzzles focus on astronomy, cryptograms, jigsaw puzzles, and word searches. The three levels of play vary in difficulty but not in the number or type of puzzles.

Clicking on objects propels you through the castle. To get information on an item or puzzle, you switch to an eye cursor and click, then switch to a hand cursor to make things happen. This becomes annoying after a while, since the cursor-selection menu is sometimes difficult to click on.

Like most brainteaser games, Dr. Brain is sparsely documented. It does, however, include the *Fantastic Book of Logic Puzzles* (Sterling Publishing, 1986), which is helpful, since it contains logic puzzles similar to those in Dr. Brain, with answers. Within the castle you can also use hint coins (earned by solving previous puzzles) to buy clues to the current puzzle. Sometimes these clues provide all the answers; sometimes they just explain the underlying logic. Sierra Online also



Dingdong You can click on the bell till your fingers are sore, but your brain must work harder to pass the front door.

has a 900 number you can call if you're really stuck, but the clues aren't worth the expense. Plus, these clues are recorded, so you must wade through a seemingly endless voice-mail queue to get to your specific problem.

The graphics and sounds in Dr. Brain are top-drawer. In fact, if it weren't for the splashy pictures and entertaining sounds I encountered in every room, I don't think I would have had the patience to reach Dr. Brain. For me, the collection was marginally entertaining (the word searches, hangman, and cryptograms tend to be too easy), but I think that a middle-school to high-school audience would appreciate it. Still, I have to admit, Dr. Brain contained enough tough and unusual puzzles to give my ego a challenge and a boost.—MATTHEW R. CLARK

Educational Game

Headline Harry and the Great Paper Race

PROS: Entertaining; good variety of stories; fun trivia questions. **CONS:** Limited educational value.

COMPANY: Davidson & Associates (310/793-0600). **REQUIRES:** Mac LC; 3MB of RAM; color monitor; hard drive. **LIST PRICE:** \$59.95.



WOULD YOU LIKE TO BE A JOURNALIST with an unlimited expense account and the ability to travel through time? Headline Harry and the Great Paper Race is your chance. It's an educational history and geography game where you play a reporter for the *U.S. Daily Star*, tracking down a true story from one of the past four decades by traveling all over the United States.

Of course it's not that simple. As a reporter, you're competing with those evil villains from the *Diabolical Daily*, who want nothing more than to mislead the public with mixed-up stories and confusion. You've got to beat them to the newsstand by uncovering all the facts in your story before time runs out. Humorous obstacles (described in dialog boxes) slow you down, unless you

correctly answer the trivia questions. Occasionally, *Diabolical Daily* reporters lose their keys, notebooks, or other objects, and you gain time by grabbing the items.

Your high-tech research tool (and the game's main interface) is a Scoop 2000 portable photo-journal. On one side, it has a series of buttons; on the other, a window displays the action. The main buttons represent such things as a radio, a tape player, reference books, a video recorder, newsreels, and a videophone with direct dial to some helpful people. These provide clues to your story, and to the era in which the story is set. There's also a series of buttons that provide game-oriented assistance. They show such things as an itinerary of ten places where you might find information for a story, a timetable showing the time each action takes, and other useful facts.

Finally, a series of buttons access your notebook, where you record the details of a story—the place, time, date, people, actual event, and key words. When you enter the correct facts, green lights go on and a bell sounds. When you have all the facts, you send the story to Headline Harry, your editor. He congratulates you and shows you your well-written story, complete with your title and byline.

Traveling between places is easy and educational. One click on the map icon of the photo-journal changes your view to a

map of the U.S. Click on any state and you see that state with its main cities. As you return to the maps over and over again, you get a strong sense of where places are in relationship to other places. Still, you don't learn much about any of them.

Historically speaking, the game is less educational. Although complete stories are better than isolated facts, many of the stories aren't particularly significant. Some, such as Samantha Smith writing to the Kremlin, or even Rosa Parks refusing to stand on a bus, aren't necessarily understandable without some knowledge of the broader context—the cold war or the civil rights movement—an understanding that a ten-year-old is unlikely to have. The Quick-Time newsreels are good examples. If you don't already know the U.S. history of the past 40 years, the clips don't mean anything. Unfortunately, unlike the Carmen Sandiego games, Headline Harry doesn't teach students how to find the answers to their questions by using a reference source.

Headline Harry isn't an educational masterpiece, but it is fun. The trivia questions are bizarre but entertaining, and the stories are all interesting, if not deeply meaningful. The time limit and the grab for lost objects add a touch of video-game challenge, and aspiring reporters get to see their byline on the front page of a newspaper.

—WENDY SHARP



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Personalized Handwriting Font

PersonalFont

PROS: Font comes in TrueType and PostScript Type 3 formats; letters are connected when PostScript is used. **CONS:** Some letters appear cramped; small or slanted handwriting can look messy. **COMPANY:** Signature Software (408/458-0241). **REQUIRES:** Mac Plus; System 6.0.5. Recommended: PostScript printer. **LIST PRICE:** \$179.95.



FOR YEARS MY FRIENDS COM-
plained about receiving typewritten letters. They claimed the letters were impersonal. And while I could justify sending the typed letters, I silently wished for a computer font that looked like my handwriting.

When I heard about PersonalFont, a service from Signature Software that creates printer fonts from samples of a person's handwriting, I was thrilled. And PersonalFont does most of what its maker claims.

The floppy disk you receive after submitting your order contains TrueType and PostScript Type 3 fonts of your handwriting (including your signature), which are accessible from the Font menu, with connected cursive letters. The only benefit Sig-

nature Software promised that I did not get was neater handwriting.

The results were good. I can definitely recognize the font as my handwriting. However, it looks rather like I've been writing in a car. My handwriting is very slanted, and the letters are small. Handwriting with larger, straighter letters yields better results. Non-cursive handwriting, especially when composed of capital letters, works even better.

To acquire your own font, you write 26 words and sundry characters on an order form, which is then scanned into Signature Software's system. A human operator processes each order using specialized software developed over the last three years by Signature Software's founders. Operators work through each character, picking the letters and making the connections that best fit your handwriting.

Part of PersonalFont's appeal is that different characters are used for a letter depending on where the letter occurs in the word. The program preserves some of the flourishes in your handwriting in letters that are at the beginning and the end of words. The look of letters within words depends on what letters are on each side.

*A fanfare for the common oaf.
A fanfare for the common oaf.*

Type Your Handwriting PersonalFont uses different characters for the same letter at the beginning, middle, and end of a word, as seen here with the letter *f*. The result can be cramped letters. The bottom line is handwritten, but overall can you see a difference?

PersonalFont is not available in PostScript Type 1 font format because making the connections between letters requires Type 3's flexibility. The TrueType font is needed for on-screen use and for use with non-PostScript printers, but because of TrueType 1.0's limitations, characters are not connected. According to Signature, TrueType 2.0 will eliminate these limitations; TrueType 2.0-compatible fonts should be available from Signature Software by the time you read this.

PersonalFont is not the ultimate in personalized handwriting fonts, but future improvements should further that cause. Signature Software's original \$100 price for the product was more enticing than the current price. Nevertheless, I recommend PersonalFont for each and every person who has heard (or read) the words "typing is impersonal." See if you can tell the difference.—TIM WARNER

Motion Simulation Software

Interactive Physics II 1.0

PROS: Easy to use; complex enough for real engineering simulation; includes electrodynamics; good QuickTime support. **CONS:** Large and not particularly fast. **COMPANY:** Knowledge Revolution (415/553-8153). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive; System 6.0.5. **LIST PRICE:** \$399.

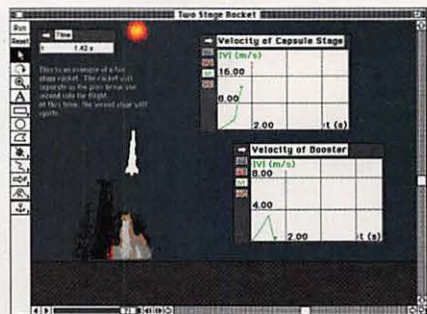


WHEN MACWORLD REVIEWED Interactive Physics, we liked it a lot, and made some suggestions for additional features. That first version of Interactive Physics is sold under the name Fun Physics for \$99, while Interactive Physics II has everything we could have asked for, and more. In some cases *more* is a problem—you need more than 4MB of RAM to run IP II comfortably under System 7, and we found that complicated simulations run slowly even on a Quadra 700 with 8MB of RAM. But the range of problems you can solve with IP II has expanded, and IP II exports simulation files to QuickTime.

In Interactive Physics II, you drag different mechanical elements (masses of arbitrary shape, motors, springs, rods, actuators,

linkages) from a palette to a construction work-space window and then define forces (gravity, electromagnetic fields, spring constants) that act on these elements and initial velocities of parts that will be moving at the start of the simulation. Dialog boxes let you define the forces in the simulations with formulas of arbitrary complexity. Then hit the Run button in the toolbox or pick the Run command from the World menu, and the stuff starts moving. You can learn to do simple simulations, such as a swinging pendulum or a cylinder rolling down an inclined plane, in a few minutes. For more complex constructions, it's useful to take apart some of the examples in IP's large library of demo simulations, but in fact you can quickly learn to make complicated constructions on your own. The numerical data behind the visual simulation output can be shown on screen through meters or chart windows and can also be exported to table files for analysis in spreadsheets or math software.

IP II has whole classes of new features. There's a wider variety of simulation objects, sliders and buttons for input, and output graphs and meters. Values can now be represented by equations instead of simple numbers, and there's a new scripting language for creating formulas. Besides the QuickTime capability, you can save the time history of a simulation to disk and then you can play it back at a faster rate. Finally, the



It's a Blast This colorful simulation of a two-stage rocket shows off a nice feature of Interactive Physics II—you can attach pictures to the objects in the simulation to generate QuickTime movies.

scope of the program has been expanded to include huge experimental scales (10^{20} meters) and complete vector displays and imposes no constraints on number of objects.

Knowledge Revolution deserves high marks for IP II. Against the background of "motorized books" in HyperCard, picture stories with background music on CD ROM, and computer versions of standard question-and-answer drills, the company has developed a product that is a serious improvement over traditional classroom instruction. IP II can also be used for real mechanical-systems simulation for machine design or industrial design, as long as you don't have more than a dozen or so moving parts.—CHARLES SEITER

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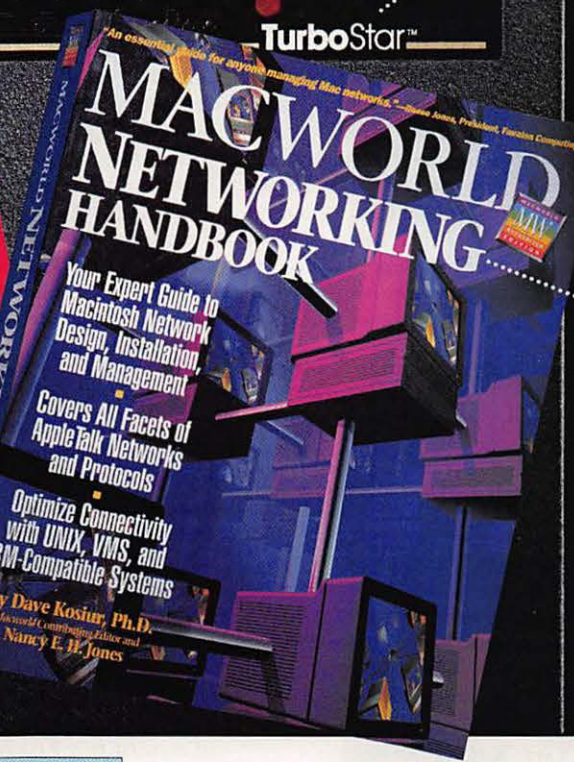
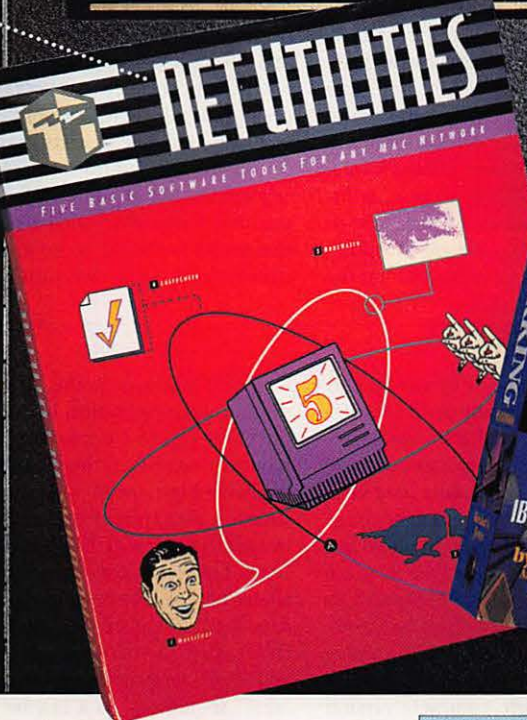
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Circle 90 on reader service card

Surge-Protected Automated Power Strip

PowerKey 2.0

PROS: Adds one-touch keyboard on/off control to any Mac and three peripherals; clever software; can turn on system and run QuickKeys macros at specified times. **CONS:** Doesn't work with Mac Plus. **COMPANY:** Sophisticated Circuits (206/485-7979). **REQUIRES:** Any Mac with ADB port. **LIST PRICE:** \$119.



IF YOU HAVE AN SE, CLASSIC, OR LC, you've probably eyed that big button at the top of the keyboard—the one with a left-pointing triangle on it—and wondered what the heck it was for. Eventually you probably discovered that on Mac II's and Quadras, this key is actually the power-on button—but on your Mac, it's just decoration.

Until now. The PowerKey looks like an attractive, Mac-colored, multiple-outlet power strip—or, more accurately, power box, since the four surge-protected outlets (the good kind, the ones that take three-prong plugs) are packed onto opposing edges of a 4-by-5-by-2-inch rectangle. You plug the Mac and keyboard into the PowerKey, and suddenly you can turn on your compact Mac or LC from the keyboard.

The PowerKey also eliminates that "You may now switch off your Macintosh safely" message that appears when you shut down your Classic or SE. When you choose Shut Down, the Mac blinks completely off, exactly like the II-class machines.

But the PowerKey's appeal isn't limited to those with do-nothing power-on keys. All four PowerKey outlets get turned on and off simultaneously. No matter what Mac model you own, you can turn on the Mac, printer, external drive, and desk lamp, all simply by touching the keyboard's power-on button—and, of course, they all go off together when you shut down the Mac.

For many people, having four nifty outlets blink on and off in surge-protected sync is joy enough. But in the "Now how much would you pay?" department, you also get the PowerKey software that's every bit as clever as the circuitry. This control panel somehow stays awake even when the Mac is off—don't ask me the technical details; it has something to do with the Mac's ever-ticking battery-powered clock—and can actually turn on the Mac, unattended, at any time you choose, on specific days of the week. Better still, the PowerKey software can fire off a QuickKeys macro of your choice (QuickKeys Lite, a stripped-down version, is included). You can set up the PowerKey to spring to life at midnight, log on to AppleLink, fetch the electronic mail, back up the

hard drive, and shut down the entire system. The PowerKey software can even send Apple events; a network manager, from a single Mac, can write an on/off/automatic backup schedule for, say, 25 PowerKey-equipped Macs in the office, using a scripting program like UserLand Frontier.

The PowerKey has taken on a new relevance with the advent of PowerBooks and remote-access computing. A companion product, PowerKey Remote (\$49), is a tiny plastic doodad that hooks up to your phone line and modem, so that you can trigger all the PowerKey's magic just by dialing in, from anywhere in the world. (In the event of a wrong number, your Mac shuts itself down after an amount of time you specify.)

Lest you get the impression that this device is flawless, let it be known that it doesn't work with the Mac Plus (which has an older, non-ADB keyboard jack). And the PowerKey control panel has incompatibilities with MacTel hard drives, Kensington trackballs with extra-long cords, and Baseline's Talking Moose. Then again, you only need the PowerKey software if you want to do all that middle-of-the-night automation jazz; the hardware does its keyboard power-on-button (and shutdown) stunts without any software at all. The PowerKey is an ingenious, hassle-free, well-designed add-on that seems to contain some sophisticated circuits indeed.—DAVID POGUE

Molecular-Biology Software

Sequencher 2.0

PROS: Fast; user-specifiable search-and-match characteristics; checks for adventitious vectors; voice interaction for sequence reading. **CONS:** Needs more map-construction features; hardware copy-protection scheme. **COMPANY:** Gene Codes Corporation (313/769-7249). **REQUIRES:** Mac SE; 2MB of RAM (4MB for System 7); System 6.0.5. **LIST PRICE:** \$2200.



SEQUENCHER IS THE BEST SOFTWARE currently available for manipulating DNA-sequence information on a computer. While it lacks some of the features found in molecular-biology software for other platforms, and is also missing some of the amenities found in Mac programs from the largest molecular-biology firms, Sequencher has the paramount virtue of raw speed. Rather than implement everything a DNA researcher could want, Gene Codes has provided everything a researcher actually needs and has done an impressive job.

There are different experiments for sequencing DNA, which means identifying the order of the nucleotide bases guanine, adenine, thymine, and cytosine (G, A, T, C)

along the DNA molecule. The problem is that the experiments typically give information about fragments, and the researcher must find out where different experimental fragments belong in the colossally long connected string of bases. A sequenced fragment, for example, may be 400 to 600 bases long, and the researcher must find its place in a DNA section a hundred thousand to millions of bases long. It's as if you had overlapping fragments of all the paragraphs in *War and Peace* and were faced with the task of constructing a correct, complete version of the book. Sequencher is therefore like a highly specialized word processor designed to operate on sentences composed of the letters G, A, T, and C.

The experimental data on fragments must be knitted together to identify contiguous alignments, nicknamed contigs, where fragment information overlaps. In Sequencher you define a project (a folder that contains your experimental-data files), and within the project you can decide to look for contigs yourself, by entering special sequences for the program to find, or ask the program to look for all possible contigs automatically. Since there is typically ambiguity in experimental data (a base might be known to be either A or G, for example), you can set the statistical certainty level of the contig-finding process and check the results yourself in the sequence editor.

This process is the program's overwhelming strong point. It's so fast that you can check sets of dozens to hundreds of fragments in seconds rather than minutes. At a similarly high speed, you can look for restriction sites (places where the DNA is cut by special enzymes). A special utility lets you check for vector contamination of your database files or files downloaded from genetic data banks (vectors are small fragments of DNA used in the sequencing experiment and aren't supposed to show up in the final, "real" sequence). As a last bit of searching prowess, Sequencher is also great for finding transposon-induced duplications.

Version 2.0 introduces some novelties: vocal read-back of sequences using celebrity voices (molecular-biology celebrities, anyway); an interface to Applied Biosystems' automated sequencers; and motif marking to highlight points of interest in long sequences. These are enhancements of the program's basic mission—if you want software with more emphasis on publication graphics, you might prefer Textco's Gene Construction Kit, or for a package covering other topics in molecular biology, consider IBI's MacVector. But if your lab is sequencing more than 1500 bases per week, just get a copy of Sequencher and use it as your main sequence-management program. For serious sequencing, it's your best bet on the Mac.—CHARLES SEITER

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Circle 89 on reader service card

Nutrition-Analysis Software

The Diet Balancer 1.0

PROS: Extensive foods database; easy to learn; clear charts. **CONS:** Poor manual; no color support; no online help. **COMPANY:** Nutridata Software Corporation (914/298-1308). **REQUIRES:** Mac Plus; System 6.0.4. **LIST PRICE:** \$69.95.



Nutri-Calc Plus 1.2

PROS: Extensive foods database; good manual; thorough nutrition analysis. **CONS:** Cumbersome design; no preplanned meals. **COMPANY:** Camde Corporation (602/926-2632). **REQUIRES:** Mac Plus; second disk drive or hard drive; System 6.0. **LIST PRICE:** \$225; site licenses available.



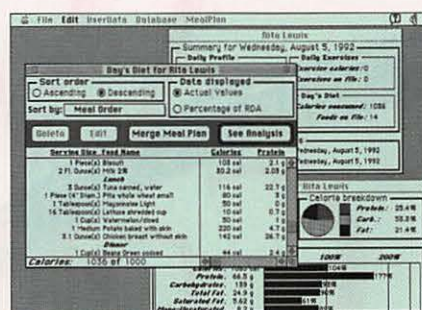
HEALTH-CONSCIOUS MACINTOSH users can now choose between two programs that manage nutrition information and analyze personal diets. Nutri-Calc Plus and The Diet Balancer both consist of user-extensible databases (or food lists) listing the nutritional values and standard serving sizes of a wide variety of foods, including fast foods, brand-name prepared foods, and

cooking ingredients. Nutri-Calc Plus measures 33 nutrients and has a database of 3500 foods. The Diet Balancer analyzes 26 nutrients from 1750 foods; additional food lists are optional.

Of the two, I like The Diet Balancer better for its easy-to-use personalized weight-planning tools. Nutri-Calc Plus has similar tools but gives less assistance with individual weight planning. In both cases, you use the food lists and search tools to construct meal lists, which consist of recipes broken down to their constituent parts. Portion screens let you alter the quantities of each food.

Both programs display nutritional values of meals on various types of charts—such as a pie chart showing the percentage of proteins, carbohydrates, and fats in your diet; or a bar chart showing the types of fats in selected meals. The Diet Balancer limits its analysis to a breakdown of meals into percentages of the recommended daily allowance (RDA) for its 26 tracked nutrients; Nutri-Calc Plus displays this type of breakdown as well as more extensive analyses of proteins and fats. Both programs display graphs of an individual's dietary history based on records of the user's weight changes over time.

Nutri-Calc Plus is powerful, enabling knowledgeable users to design meals down to the exact quantities of nutrients in each



The Diet Balancer These charts show the caloric and nutritional value of selected meals.

ingredient to meet any dietary requirement. This flexibility makes the program more difficult to master, since you have to know what nutrient quantities to alter and what effect each has on the body. Also, its lack of pre-built meal plans makes designing meals difficult. Unlike The Diet Balancer, Nutri-Calc Plus does not catalog foods by meal type (breakfast, lunch, or dinner) or let you search by meal type. The Diet Balancer lets you save meal plans and their analyses. Nutri-Calc saves only the nutrient totals and not the food lists—a major shortcoming.

In summary, The Diet Balancer is useful for home diet planning, whereas Nutri-Calc Plus is positioned for use as a professional nutritionist's diet-planning tool.

—RITA LEWIS

Networked Backup Software

SnapBack 1.0

PROS: Simple setup; any Mac can be a server; backup can be mounted like a server volume. **CONS:** Requires a dedicated hard drive; program cannot log on while another application on the server is in use. **COMPANY:** Golden Triangle Computers (619/279-2100). **REQUIRES:** Mac Plus; 2MB of RAM (3MB with System 7); dedicated server; hard drive; System 6.0.4. **LIST PRICE:** \$129; 6 additional users \$229; 12 additional users \$329.



MANY PEOPLE EXPECT networked backup programs to be bursting with features, but SnapBack's strength lies in its simplicity. Initial setup on the server using the administrator software takes only a few minutes, and SnapBack presents individual users with an easy-to-use, one-window interface.

You can designate files for backup by giving them a certain label in the Finder (under the Color menu for System 6; under the Label menu for System 7). This option is grayed out on systems with fewer than 16 bits of color. Alternatively, you can specify files according to modification date or a

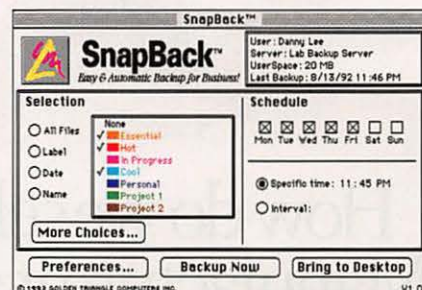
user-defined extension (such as .backup), or simply back up all files. SnapBack also lets you exclude folders, though not individual files, so you can limit a backup to the most important folders.

You can choose the time and days of the week when you want the data to be backed up, or opt for an interval—from every 1 minute up to every 17 hours.

SnapBack backs up data to a networked hard drive, a removable drive, or an erasable optical drive that has been formatted and partitioned with the SnapBack server software into volumes—one for each SnapBack user. To retrieve files from the server, you simply click on the Bring to Desktop button, which mounts the backup partition just like an AppleShare volume. You can also copy, delete, and move files within folders in the backup.

Since the network administrator fixes partition sizes on the server at setup, individual users are limited to the amount of data they can back up and store. One handy feature, Test Backup Size, calculates how much data you have selected for backup. To save space and time, SnapBack does not back up files that have not changed since the last backup, instead moving them to the most recent backup folder.

SnapBack is slow compared with Dantz Development's Retrospect Remote (although faster than System 7's file sharing),

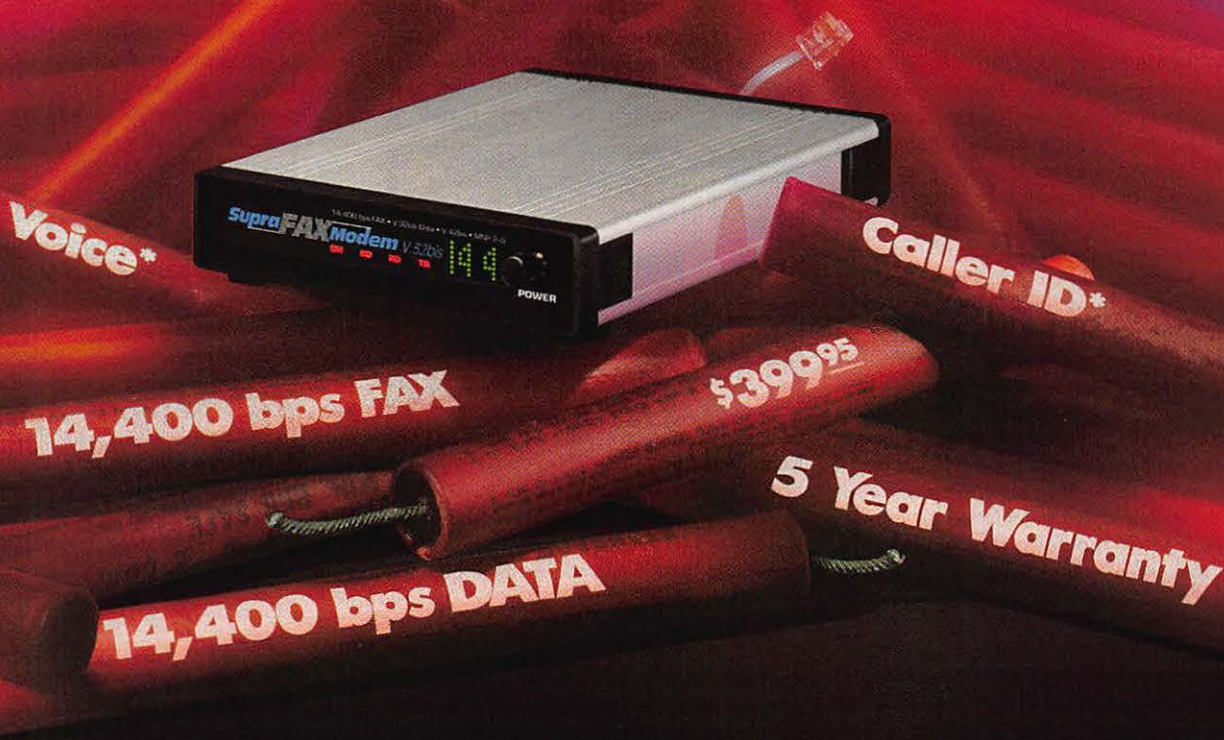


Pick Your Protection SnapBack lets you choose files for backup with several options, including by the file's label (shown here).

so it's best to schedule backups for after work hours. Other, more minor shortcomings include not being able to print backup reports to a file and misleading progress bars that show the backup to be 100 percent complete but that linger before returning control of the Mac to you.

Because hard drives can fail—including backup drives—I recommend making periodic backups to tape using more-robust software. SnapBack is a great choice for regular day-to-day backups. According to Golden Triangle, a new version of SnapBack (which should be available by the time you read this) will include scripts that enable users to save backup parameters for several common backup tasks, as well as add more file-selection criteria.—TIM WARNER

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Board Game

Go Master 5.0

PROS: Plays a respectable game of go; incorporates many helpful learning aids and sample games; modem play and other tutorial features. **CONS:**

None. **COMPANY:** Toyogo (808/396-5526).

REQUIRES: Mac 512K. **LIST PRICE:** \$69.

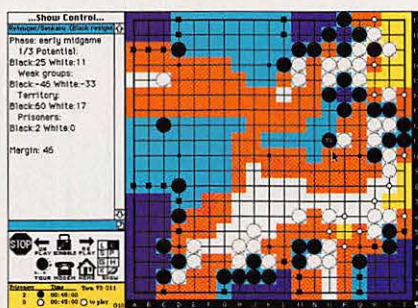


AROUND 2300 B.C., THE GAME OF GO emerged in China. It's quite simple on the surface, and you can learn the rules in a few minutes, but it's one of a handful of games not yet conquered by the computer.

In go, two players take turns placing stones, black for one player and white for the other, on a grid. The aim of the game is to surround and control areas on the board by forming continuous chains of stones. There are a few rules for capturing isolated stones and groups of stones, and scoring just consists of counting the grid points controlled by each side. The problem is that until you develop some strategic sense, looking down at the big blank board and trying to find a reason to place your stone on one of the possible 361 grid points instead of on another can be bewildering. An American computer scientist named

Bruce Wilcox decided that if he could evolve some general strategic principles, he might be able to write an "intelligent" computer go program (one that follows strategy rules rather than searching all possible moves exhaustively) and develop a faster way to learn go skills. He succeeded, and Go Master 5.0 is the best way to learn go and is a stronger player than earlier versions (the Mac version can play respectably against dedicated hardware go machines from Japan).

Version 5.0 is full of learning improvements. It supports modem play—you can now take go lessons from professionals or play cross-country. The game window now features a Tour button for easy review of



Coming to Go Go Master lets you display "controlled" areas of the board and gives you a running strategic commentary in a text window. Using these two facilities, you learn go at record speed. In this game, incidentally, white went on to win.

annotated games, and tours from beginning to advanced games are provided in Go Master "book" files. But in go as in life, the real issue is "What's your next move?" and version 5.0 has the answer. The setup screen, for example, lets you request a continuous stream of hints and explanations of tactics, and try out moves and then unplay them. But the more impressive visual go aids are called from the Show menu, available as a standard Mac menu or as a little icon window next to the game board. Besides hints, the Show choices include liberties (safety levels of stones), control zones on the board, current score, groups of stones and their connections, patterns or obvious responses, and capturable stones.

The effect of this barrage of prompts is remarkable: after 10 to 20 games, you may find that you have absorbed enough strategic principles that you can often apply them as well as or better than your Mac. Fortunately, go has a built-in handicapping system (the weaker player gets a defined number of "free" stones to put down at the beginning of the game) so that you can always make a go game a real challenge. Toyogo makes a less expensive Junior version, and offers a tool kit and extra tutorials for experienced players, but I recommend Go Master to anyone with the slightest interest in games or even in computer science.—CHARLES SEITER

Network-Support Utilities

TechWorks NetUtilities

PROS: Good value; well-rounded suite of tools. **CONS:** No automatic notification in conferencing module. **COMPANY:** Technology Works (512/794-8533). **REQUIRES:** Mac Plus; System 6.0.5; AppleTalk version 48-compatible network. **LIST PRICE:** \$129.



DECIDING TO SHELL OUT BIG bucks to set up a Macintosh network may be the most harrowing responsibility an office manager or business owner will ever face. Then once the network is up and running, it needs to be kept that way. Network-monitoring and -configuration utilities, now proliferating on the market, can help you maintain a network in good shape.

Unfortunately, these utilities tend to be expensive—from \$500 to \$900, street price. TechWorks NetUtilities provides some essential network-monitoring tools at a price to please even the most penny-pinching financial officer. But don't let the price fool you—NetUtilities is a solid collection of five separate applications, which operate from similar interfaces. Together they provide capabilities found in costlier packages, with-

out including features that often prove to be surplus rather than necessity. In testing, all the utilities functioned without a hitch. The well-written manual clearly explains the function of each utility and how to interpret the data they provide.

NameScan scans the network for devices and builds a simple but complete list of network-specific information such as the network number, zone, responder name, and socket number. You can sort the list by any field and export the information to a word processor, database, or spreadsheet.

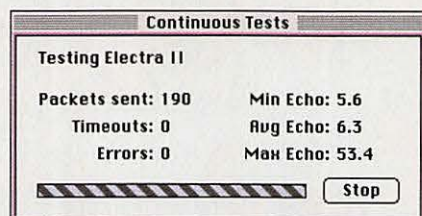
NetTimer measures the time data takes to travel from one machine to another and reports on network performance. Excellent charting and graphing capabilities enable you to track this performance over time as well as compare different devices. NodeWatch monitors devices you specify and lets

you know when they go offline or online, keeping you informed of trouble spots. When problems arise, NodeWatch notifies you by sound, dialog box, or by launching a program such as a paging application.

LaserCheck lets you retrieve information from, and configure, laser printers on the network. You can assign them names and see how many pages they've printed and how much memory they are using. LaserCheck also displays font information and downloads PostScript files to printers. Best of all, LaserCheck can name printers across network zones; similar applications cannot.

MultiChat is sort of a mini-messaging system that can be used for electronic conferencing. Anyone with MultiChat installed can begin a conversation and then invite others to join in. Its only drawback is that you can't alert people electronically; you have to notify potential participants in person. At that point, unless you need to document your conversation, you might as well finish the conversation in person. You can use MultiChat throughout an office without purchasing copies for each station.

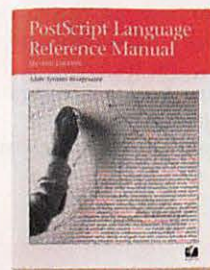
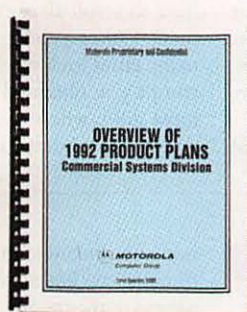
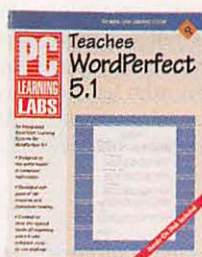
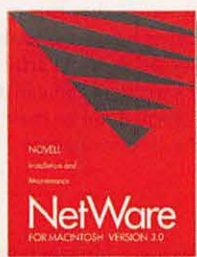
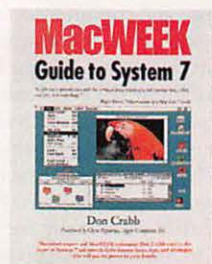
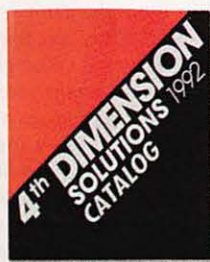
TechWorks NetUtilities makes a great foundation for the budding network guru. Even seasoned professionals may find that for \$129, they can do without some of the extras, such as network mapping, CPU inventory, and software updates, that go into more costly packages.—MATTHEW R. CLARK



The Computer Is Listening NetTimer provides a simple but effective way to perform continuous echo-packet testing, helpful in diagnosing a poor network connection.

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Strategy Game

Warlords

PROS: Beautiful graphics and sound; colorful.

CONS: Army moves are tedious; computer opponents not strong enough. **COMPANY:** Strategic Studies Group (904/494-9373).

REQUIRES: Mac Plus; 2MB of RAM for color; System 6.0.2.

LIST PRICE: \$59.95.

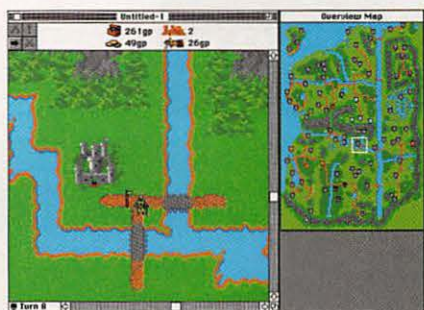


WARLORDS IS A COLORFUL GAME of strategy and conquest set in a medieval fantasy world on the continent of Illuria. You start out as one of eight leaders, each the ruler of his or her own capital. You can choose to play the elves of Elvallie, the evil Lord Bane, or any of the other six contenders for supremacy. On the first move, a hero arises in your capital, a powerful warrior ready to battle your many foes. Your first object is to subdue the surrounding neutral cities and use them as bases to recruit regular troops (not heroes). Along the way your hero must search ruins and visit temples in hopes of finding magic weapons and obtaining the blessings of the gods. Your long-term goal is to conquer everything on the map, of course.

To win, you have to decide what kind of

troops to recruit, how large a garrison to keep at each city, when to launch an attack, and when to send off your hero or heroes (later in the game, you get more than one) to explore ruins instead of leading soldiers into battle. At first you should choose to recruit many units of light infantry to send against the many lightly defended neutral cities. Later, as enemy troops grow in numbers and quality, you must decide whether to recruit a unit of light infantry each turn, or a unit of cavalry that costs several turns. The variety of troop types, ranging from elven archers to wolf-riders and pegasi, adds a lot to the colorfulness and complexity of the game.

The best features of Warlords are its beautiful color graphics, nice sounds, and useful report screens. If you want to locate all your heroes, there's a report screen for that. If you want to check on the type of troop a city is assembling, you just click on the city and the production screen pops up. The production screen includes a small map of the continent where you can click on the other cities you control and check what troop type they are producing; you don't have to scroll all over the much larger main map. Other report screens tell you how many cities each warlord controls, what new troops you obtained this turn, who has the most gold, where the various ruins are and which have been ransacked, who has de-



Hero at the Crossroads In the left window, Lord Percivale of Elvallie is poised to attack a neutral city. In the window on the right, you can click on any area of the continental map and get a close-up view of that area (shown in the left window).

clared war against whom, and who's ahead in the race to victory.

One drawback of the game is that moving your troops around gets tedious as your army gets larger. Another drawback is that, even at the highest level of difficulty, the computer opponents are not quite challenging enough for an experienced war-gamer. Strategic Studies Group, the distributor of Warlords, notes that this is not a problem when playing against one or more human opponents. All in all, Warlords is a pleasing hybrid of a strategy game in a fantasy world. And I've learned not to trust anyone named Lord Bane.—TOM MORAN

Contact and Project Management

Office Manager 2.1

PROS: Easy to set up; easy to use; tracks both phone calls and correspondence; handles mail merge and envelope printing for mailing lists. **CONS:**

Slow when using address books with 100 names or more; doesn't include fee calculation in job log. **COMPANY:** White Crow Software (802/

658-1270). **REQUIRES:** Mac Plus; 2MB

of RAM; hard drive; System 6.0.5. **LIST PRICE:** Office Manager \$99; Office Manager Remote \$79; Office Manager plus Mail Manager \$149.



SOMETIMES THE MOST EFFICIENT tools are the simple ones. If you need to keep track of your business contacts and correspondence, it just might be that simple management software like White Crow's Office Manager will fit the bill.

Office Manager, which requires HyperCard 2.0 to run, is a series of HyperCard stacks that lets you maintain the names and addresses of your clients, print envelopes or labels, and dial any phone number in your address list. Each stack is integrated, so moving between tasks is seamless.

The main stack, Office Manager, is designed to maintain an address list. This list

not only includes the names and addresses of contacts, but also has space for multiple phone numbers, fax numbers, a client classification (or keyword), and any additional notes you might want to add. If you are keeping track of the jobs done for a client, the Office Manager stack can track the time you spend for each job and can maintain a list of the telephone calls and correspondence exchanged with that client.

Office Manager also has the ability to link to form letters as well as individual letters to make your correspondence chores easier. Whenever you're in Office Manager, just by pushing a button, you can send a form letter or create a new letter within the stack to send to a particular client (or list of clients). The stack also lets you print an individualized fax cover sheet.

The letter editor within Office Manager isn't a full-featured word processor; it's merely enough to get the words down without any special styles or formatting. If you want to create a fancier letter, an Office Manager option lets you open your favorite word processor. The name and address of the client is automatically pasted into the new document in the word processor, making writing a bit easier. All these letters are indexed with an automatically assigned four-digit ID by Office Manager for future reference.

To complete the correspondence tasks, Office Manager also lets you perform a mail

merge between addresses selected within the stack and a letter from your word processor. One note, though—if you want better control of periodic direct mailings, you should consider purchasing Mail Manager to supplement Office Manager. Finally, the stack lets you print either envelopes or mailing labels from a list of selected addresses. Individual labels can easily be printed using the LabelWriter from CoStar Corporation.

The Turbo Dialer stack can be used with a modem and keeps track of the time spent on each modem call. Unfortunately, none of the Office Manager stacks let you insert a fee rate for converting call times to actual fees within the log.

The Office Manager stacks are designed to be used in a main office. Office Manager Remote offers much the same functionality, but is meant to be used by mobile workers. The Remote stack has an address list merge, which allows you to update the address lists found on two different Macs if changes are made while you are on the road.

Office Manager is simple but powerful. It makes the job of tracking phone calls, as well as corresponding, easier. If Office Manager has any shortcomings, it's the reliance on HyperCard, which can make many tasks slower when a database gets to be larger than 100 clients; if you have a Mac IIsi, IIfx, or Quadra, it takes many more names to slow down operations.—DAVE KOSIUR

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File-Updating Utility

UpDiff 1.0

PROS: Innovative; easy to use. **CONS:** All users need a separate copy of the program; minor documentation flaws. **COMPANY:** KyZen Corporation (609/354-3863). **REQUIRES:** Mac Plus; System 6.0.7. Recommended: Hard drive. **LIST PRICE:** \$169.



REFERENCE FILES—SHARED DOCUMENTS such as a salesperson's price list, a contract, and a database of names and addresses—are mostly static but are updated from time to time. Sometimes these documents are small enough to fit on a disk, or can be sent via modem. But if the file is large, it can take too long to transmit, or it might not fit on a floppy. UpDiff is a utility that compares an old and a new version of a file, extracts the differences between them, and creates a difference file, which is typically much smaller than either version of the original file. The difference file can then be sent via modem or disk, or over a network, to another UpDiff user. The recipient uses the difference file and UpDiff to update the old file to match the new version of the file.

The program is extremely easy to use.

To start, you simply click on the Extract Differences button. You're prompted to select first the new version, then the old version, of the file that you want to process. UpDiff scans the two files, then creates the difference file, which it automatically names by appending the suffix .DIFF to the file name. UpDiff gives you the option of compressing the .DIFF file as it is created. To update the old file to the new version, you click on the Update Old Version button, and click on the names of the .DIFF file and the old version of the file. UpDiff combines the two files and writes the updated file to disk. If the names of the old and new files are identical, UpDiff renames the old version by adding the suffix .PREV to the file.

UpDiff worked well with most of the files I tried, creating difference files that were much smaller than the originals. In the process, I learned that making changes in some programs, such as Microsoft Excel and Adobe Photoshop, can be a problem, even if those changes appear to be minor. In such cases UpDiff creates difference files that are as large as or larger than the original file. For example, changing a Photoshop image from RGB mode to Indexed Color mode, then back again, changes the whole file. Inserting a column or row in Excel makes such a large change that the .DIFF file ends up being more than half the size of the original. The documentation warns you that Up-

Diff does not work well with programs in which large changes have been created, or with files that have been compressed by programs such as Aladdin Systems' Stuffit or Salient Software's DiskDoubler.

I have a few minor gripes about the package. If you click on the Cancel button while UpDiff is creating a difference file, the program stops the process, but leaves an empty difference file on your disk; it should erase the incomplete file. Both the creator and the user of the updated document need separate copies of UpDiff; it would be nice if UpDiff could create a stand-alone difference document that could combine itself with an old version without requiring the main application, similar to the self-extracting archives created by most compression programs. The documentation fails to mention the .PREV copy that UpDiff sometimes creates. And the package left out the phone and fax numbers of the company; a KyZen representative said the missing information is included in all packages now.

UpDiff is sold in a two-pack, one for the sender and one for the recipient of the updated files. In this time of environmental concern, KyZen is to be commended for its minimal packaging.

UpDiff basically does one thing, and does it well. I strongly recommend it for organizations that need to update large documents often.—TOM NEGRINO

Cartoon Software

Comic Strip Factory 1.6

PROS: No drawing necessary; easy and fun to use. **CONS:** Black-and-white only; time-consuming to alter bitmapped images; can't resize images; ships with only six comic strip characters. **COMPANY:** Foundation Publishing (612/445-8860). **REQUIRES:** Mac 512KE. **LIST PRICE:** \$69.95.



Megatoons

PROS: Clip art with personality; MS-DOS and Mac compatible; lots of images. **CONS:** Expensive. **COMPANY:** Creative Media Services (510/843-3408). **REQUIRES:** Mac Plus; 2MB of RAM; System 6.0. **LIST PRICE:** CD ROM \$199; 12 floppy disks \$219.



COMIC STRIP FACTORY LETS THE user build bitmapped comic characters, give them dialogue balloons, and place them into comic strip panels. The program comes with the body parts to create six characters. The body parts are treated as objects, which can be moved to a comic panel and as-

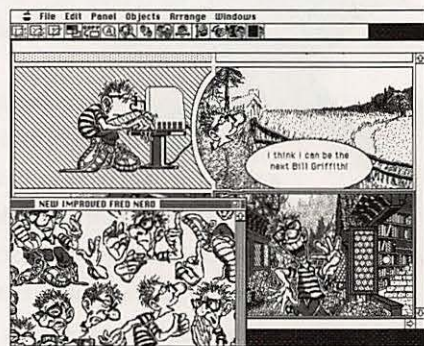
sembled into characters. You can change a character's expression using Edit Bits mode, but this involves pixel-by-pixel editing.

The group of characters (two bugs, a wizard, a horse, a nerd, and Tawny Dancer—who I think looks like a tiger-woman-elf) is pretty eccentric. Comic Strip Factory provides bitmapped, comic-style fonts and editable dialogue balloons; it automatically makes balloons fit around dialogue. The program also includes four sets of background panels.

The clear 85-page manual gives a minicourse on how to create a comic strip. The package includes a separate application, PartMaker II, which converts MacPaint-compatible files into objects that can be used as comic parts or backgrounds in Comic Strip Factory. Comic strip files can be saved in CSF format or as MacPaint files.

Two collections of additional comic strip characters and backgrounds, Kid Stuff and Office Days, are available for \$39.95 each. These collections can be converted to MacPaint format and used with other graphics programs.

Comic Strip Factory is a good tool for adding comics to newsletters, E-Mail forms, and memos. If that seems like too much work, take a look at Creative Media Services' Megatoons, a collection of 600 illustrations drawn by cartoonist Phil Frank. Many clip-art packages are bland, lifeless



Comic Strip Factory The custom icon bar gives one-click access to commonly used features. Panel shape can be highly modified.

collections of boring art, but Frank's style makes this collection clever and original.

The drawings in Megatoons are 300-dpi TIFF format files, so they can be modified by most graphics programs. The CD ROM contains Zedcor's DeskPaint DA 2.0, allowing manipulation of the images without additional graphics software (DeskPaint DA is not included with the floppy-disk version).

I like Phil Frank's art. Megatoons comes with an image index booklet that you can flip through before you open the CD or disks. If Frank's style doesn't fit your needs, CMS will refund your purchase price. CMS also offers other, smaller collections of Frank cartoons for \$50 to \$80.—JIM FEELEY

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Cordless Mouse

Cordless SuperMouse

PROS: Receiver plugs into ADB port; convenient recharging stand; spare battery included. **CONS:** Only recharges when the Mac is turned on. **COMPANY:** Z-Nix Company (714/629-8050). **REQUIRES:** Any Mac with ADB port. **LIST PRICE:** \$99.



THE Z-NIX SUPERMOUSE COMES closer than other cordless mice I've tried, to fulfilling the dream of mousing without strings attached. Its rounded contour is more comfortable than many other mice, it fits my palm snugly, and the design is sleek and attractive. The two big buttons are easy to reach, and have adequate audible and tactile feedback when pressed. The left button functions like the one on Apple's mouse. A software control panel lets you program its right button to double-click, click-lock, or execute a user-specified key sequence. (Alas, lefties can't reverse the buttons' operation.)

Cordless mice are a bit like portable telephones, though: to avoid frustration, it helps if you understand their limitations. To work without a cord, the device uses infra-

red light to communicate with a receiver built into its stand, which plugs into the Mac's ADB (Apple Desktop Bus) port. If you have infrared devices, such as TV remote controls, you know they can be finicky, and the SuperMouse is no exception. In general, the mouse should face in the direction of the receiver. In my tests, cursor motion was smooth most of the time; response was erratic only when the mouse was angled sharply or when the infrared beam was interrupted by desktop clutter. (To avoid this problem, Z-Nix suggests raising the receiver slightly above the work surface.) As claimed, the SuperMouse worked up to 6 feet away from the mouse stand, but only as long as perfect line of sight was maintained.

The SuperMouse is powered by a compact nickel-cadmium battery that comes charged, so you can use the mouse right out of the box unless it's been lying on the dealer's shelf for a few months. A spare battery stows in a recharging compartment in the bottom of the stand, and swapping batteries takes only a few seconds. The stand recharges the main and backup batteries simultaneously. Because the charger draws power directly from the Mac, there's no need for a separate AC adapter. According to the manual, a full charge should be sufficient for about eight hours of continuous power, or two to three days of routine operation. During one week of heavy daily use,



Cordless SuperMouse for the Macintosh

I didn't have to change batteries once. The only drawback is that the charger functions only when the computer is turned on—if the Mac is switched off for an extended period (several months, according to Z-Nix), the batteries might discharge completely.

Although I'm not about to trade in my corded mouse, the SuperMouse is an excellent choice if you dislike untangling cords or if your work occasionally demands that you step back from the computer. Like any well-designed product, the SuperMouse works reliably, and it's attractively priced. —FRANKLIN N. TESSLER

Flight Simulator Control Hardware

The Mouse Yoke

PROS: Clever engineering; quality materials in design and construction. **CONS:** Unpadded clamp could mar desktop; works poorly with driving or shooting games. **COMPANY:** Colorado Spectrum (303/225-6929). **REQUIRES:** Mac 128K; any standard mouse; flight simulator that accepts mouse-control input. **LIST PRICE:** \$34.95.



THE MOUSE YOKE IS THE KIND OF product that makes you say "I sure wish I'd thought of that." This gadget turns an ordinary mechanical mouse into an aircraft-style steering wheel, or yoke, for use with flight simulators and similar mouse-driven entertainment software. Turning the yoke and moving it in or out gives you full three-dimensional control. Without electrical connections or—more important—extra software, The Mouse Yoke provides most of the functionality of electronic flight-simulator controls costing twice as much.

You use The Mouse Yoke by strapping the mouse onto an extruded aluminum fixture, which in turn clamps onto your desk. The mouse ball rests over a groove in the fixture, and a hefty plastic shaft attached to

a Cessna-style aircraft yoke rotates the mouse ball. Moving the yoke in and out controls up-and-down motion, and turning the yoke twists the shaft for left-right motion. The concept is stunningly simple and elegantly executed.

Part of that elegance is in quality materials. The black-anodized metal fixture has no paint to chip off, and the matching aluminum clamp has an extra-wide jaw to accommodate most desks, with sturdy metal parts and a large knurled knob. A replaceable elastic strap holds the mouse to the fixture, and the remaining parts—the shaft and yoke—fit precisely and move smoothly and solidly. My only concern is that the unpadded metal jaw could mar wooden surfaces.

The well-written manual explains in general how to configure your program to work with The Mouse Yoke and gives specific instructions for running with Microsoft Flight Simulator. Most flight simulators require you to center your controls, so that the screen display and input device agree as to what constitute the horizontal and vertical positions of your aircraft. With The Mouse Yoke, after selecting the mouse for control input, you set horizontal and vertical control sensitivities to their maximums. Next you center The Mouse Yoke's shaft and yoke, and press the program's mouse-centering key. As long as you keep your movements

smooth, The Mouse Yoke retains perfect tracking and centering; with sudden movements, the mouse ball and yoke shaft tend to slip, and sometimes after executing a few aerobatic maneuvers you'll find level flight requires an unsettlingly crooked yoke. Recentering the controls quickly squares things up, though.

Although it fares well with several flight-simulator packages, The Mouse Yoke works very poorly for driving simulations, such as Velocity Development's Spectre, the tank-driving game (Colorado Spectrum has announced a Mouse Wheel, specifically for driving simulations). The Mouse Yoke is also inconvenient for simulations using the mouse button as a firing control, because the mouse is mounted up on the fixture away from your fingers. Electronic plug-in controls have flight controls installed in a yoke or joystick right under your finger, but The Mouse Yoke's design precludes this.

All in all, though, The Mouse Yoke is a reasonable alternative to electronic plug-ins. You get 90 percent of the functionality for 50 percent of the price—not a bad trade-off. If you think a mouse alone is good enough for flying a Mac around Chicago, your first excursion with The Mouse Yoke may surprise you. A few figure-eight turns will convince you that steering with a bar of soap is for the—well, for cheapskates.

—MEL BECKMAN

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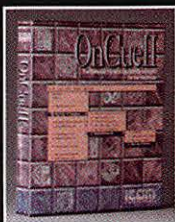
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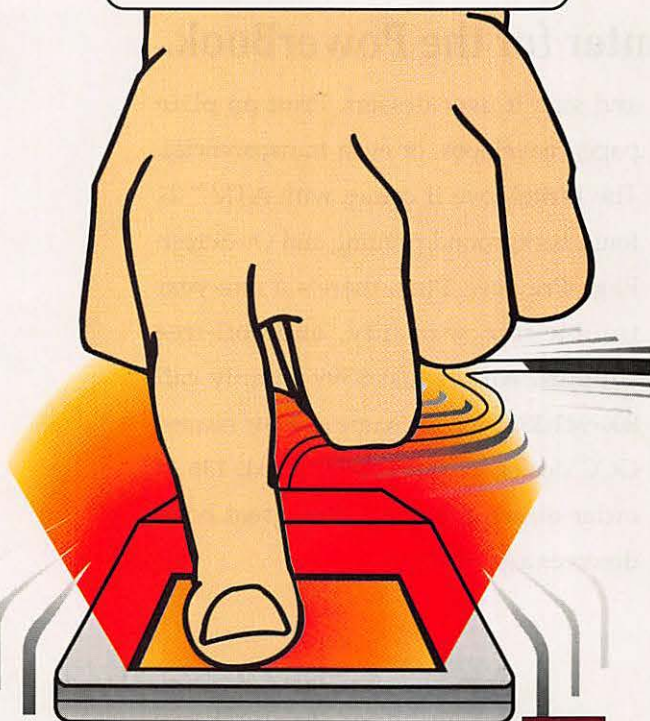
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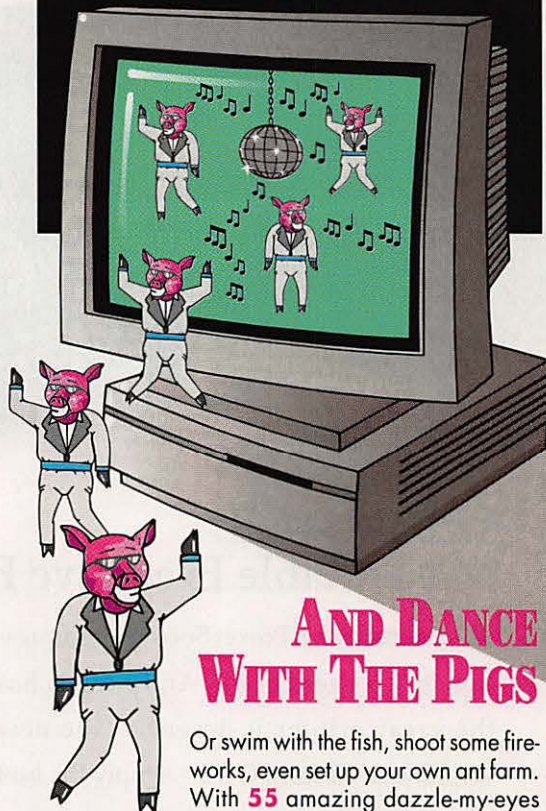
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The Desktop Christmas

BY DAVID POGUE

GOMING UP WITH ORIGINAL holiday gifts for the Mac owners on your list is never easy. I mean, how many years in a row can you give somebody a mouse pad? You can get by with giving disk wallets or dust covers, I guess, as long as you don't mind seeing a lot of that expression people have when they get ties.

After weeks of exhaustive research (going through five or six catalogs, at least), my elves and I merrily offer the following more creative suggestions. Each item meets our stringent East Pole qualifications: (1) Nothing over \$50. (2) No games, because they're covered elsewhere in this issue. (3) Nothing buggy, cheesy, or predictable.

After Dark for Macintosh 2.0

AFTER DARK (BERKELEY SYSTEMS, \$49.95) is the screen saver made famous by the absurdist Flying Toasters. When you haven't used the Mac for several minutes, After Dark blackens the screen, and until you touch the mouse or keyboard again, colorful, animated images—like fish, or space invaders, or of course, winged toasters—bounce around the screen. The ostensible purpose of a screen saver is to prevent a static image from burning a permanent ghost picture into the screen. But come on—have you *ever* seen a permanent image etched on the screen? Me neither.

No, you give someone After Dark for more important reasons. First, status; watching one of those complicated-looking, Spirograph-type After Dark animations, you can't help but conclude that the Mac's owner is a super-proficient brainiac. Second, After Dark's spin-offs can take care of the next few years' worth of year-end gifts; next December you can give More After Dark (Berkeley Systems, \$39.95), a set of additional goofy and wonderful modules, like the Lawnmower Man who drives his tractor across your spreadsheet. Year after that you can give Art of Darkness, a disk with still more modules, tucked into the back cover of a funny, fluffy trifle of a book of the same name (Peachpit Press, \$19.95; written by *Macworld* contributing editor Erfert Fenton, if that makes any difference). And if computers still require screens at all in 1995,

you can complete the collection with Cool Mac After Dark, another book-disk set (Hayden Publishing, \$19.95; written by Ross Scott Rubin).

Surge Reactor Remote

I KNOW WHAT YOU'RE THINKING: AS holiday gifts go, a surge-protected power strip has about as much holiday cheer as a tub of axle grease. It's not even imaginative; you can get a power strip at any hardware store. And even though these strips let you turn on all your computer appliances with one button, you have to crawl around behind the furniture to get at the on/off switch.

Good ol' American ingenuity solved the problem, coming up with a dandy new riff on the old multiple-outlet theme: a *remote-controlled* power strip (Global Computer Supplies, \$43). The surge-protected outlets on this rugged baby lie amid the dust bunnies behind your desk. But the on/off switch is on the end of its own 4-foot cord, which you can mount at desk level, strap to your thigh, or whatever. In one fell swoop, you'll protect both the recipients' equipment (against those troublesome lightning bolts) and vertebrae.

From Alice to Ocean

FROM THE TITLE, YOU MIGHT ASSUME that this coffee-table oeuvre is an alphabet book. Nope; it's a stunningly photographed, brilliantly written account of a 27-year-old woman's solo camel ride across the Australian desert. It was photographed and produced by Rick Smolan, that guy who first created the *A Day in the Life* photo-book series. The beauty of this book takes the breath away, and the writing's wit, insight, and honesty is remarkable. (Typical candor: Author/camelist Robyn Davidson reveals that photographer Smolan's lurking presence on the trip was a major irritant.)

What makes the book a Mac lover's gift, though, is the CD ROM bundled inside the cover. It contains a photo-rich, narrated slide show of the story, complete with maps, interactive detours, and QuickTime video clips. The disc makes the overall package (Ad-

dison-Wesley, \$48.95) a doubly fascinating and appealing gift for the armchair traveler who'd rather read, watch, and hear about a 1700-mile desert than cross it.

(There is a second silvery disc included: a Kodak Photo CD filled with pictures. The Photo CD and the regular CD ROM each requires a special disc player, of course. If your gift recipient isn't quite so equipmentally endowed, mention that the discs make wonderful earrings.)

AutoMouse

WHEN THEY FIRST STARTED SELLING those cute, fuzzy mouse covers that look like actual mice with big doleful eyes and adorable little whiskers, I smiled—but I swore they'd never catch me dead with one of those on *my* mouse. For the red-blooded, fast-lane American, those fluffy slipcovers are lethal to whatever studly machismo you've managed to make part of your social image.

At last, there's something to cover the mouse that's more the style of the image-conscious powermonger: a fire-engine-red Corvette. It's sleek, shiny, and snaps easily onto the mouse (concealing it completely except for the telltale gray cord snaking out from under the front grille). You rest your hand on the roof and click on the hood to activate the mouse button. (If you're the kind whose self-esteem blossoms by tinkering with the innards, you can adjust the feel of the clicking by adjusting a screw that's—where else?—under the hood.) The AutoMouse (Suntime, \$19.95) looks sporty on your desk, and when you're on a boring phone call and nobody's looking, you can drive it up and down the sides of your Mac and make *bbrrrrrrmmmm* sounds with your mouth.

Wrist Rescue III, Wrist Saver, Mouse Paw

THE DESIGNERS OF THE Macintosh PowerBook wowed the industrial-design community with their cleverness: by shoving the keyboard closer to the screen, they created a handy wrist deck. As you type, your palms rest on this flat, smooth zone—to the horror of typing instructors everywhere, *continues*



*A peek
into Santa's
high-tech
goodie bag*

no doubt, but much more comfortably than on any other laptop computer.

If your gift-list people are stricken with PowerBook envy, get them either the Wrist Rescue III (Precision Line, \$7.95) or the Wrist Saver (\$14.95), which do for normal keyboards what the wrist rest does for PowerBooks. The former is a simple, thick foam pad that snuggles against the edge of the keyboard. The latter is a larger, Plexiglas affair on which the entire keyboard sits, so that the foam-padded part is always held in perfect position relative to the keys.

The company claims that people have been loving the tiny foam Mouse Paw (\$7.95), too, which Velcros onto the mouse and provides a wrist-resting station for it. My hands must be longer than the Mouse Paw designers', because my wrist winds up overshooting the back end of the Mouse Paw—but consider it a stocking stuffer for your small-wristed friends.

Fun Physics 1.2

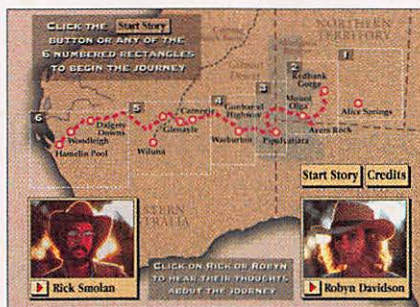
IN HIGH SCHOOL YOU LEARNED ABOUT physics. Remember? It's the study of bowling balls dropped off the Leaning Tower of Pisa, and people on infinitely fast skateboards throwing balls to each other in outer space, and returning to Earth before they left. Or something.

Turns out that physics didn't crumple up and die when we graduated. The darned thing is everywhere, as demonstrated by this cool program (Knowledge Revolution, \$99, which violates my \$50 rule, but that's life). Instead of irrelevant things like balls falling off buildings, Fun Physics illustrates (with animated line drawings) how physics affects *important* things—basketballs hitting the backboard, dominoes falling, and baseball games on the moon, for example. By adjusting the settings, you can see how dominoes would fall in zero gravity, or how a baseball bat would work if coated with rubber cement.

If you're really motivated, you can use Fun Physics' built-in drawing tools to create your own objects, each with its own mass, velocity, air resistance, and surface stickiness, then set them all crashing into each other in various nerdy ways. Seeing everything slowly animated on the Mac screen doesn't have quite the visceral splatteriness of, for example, David Letterman dropping watermelons off of the GE building. But there's much less inconvenience to passersby.

Heizer Templates

IF YOU REALLY WANT TO SURPRISE your gift recipient, order something from Heizer Software's catalog of Excel and HyperCard projects. You can almost always find *something* useful—or at least



Walking Miles with a Camel The Alice to Ocean CD ROM's navigation screen lets you choose which of six journey legs you want to watch.

bizarre. For example, this year there's the one and only Phone Number Names spreadsheet (\$12). You type in your phone number, and Phone Number Names gives you every possible combination of English words you can make out of it (so you can tell people that your number is 1-800/HOW R YOU, or something). It also does the reverse, translating JKL-MNOP into 555-6667 so you don't have to hunt and peck.

Other Heizer offerings are ideal if you have friends who will soon be hearing the pitter-patter of little feet. Depending on which kind of little feet we're talking about, consider either the Baby Name Scrambler or the Horse Race Analyzer. The former (\$9) digs into its database of 1500 boys' and girls' names, and generates over 1 million possible combos (Luther Dean, Ethel Stella, Xerxes Norman, and so on), and the latter (\$15), of course, analyzes horse races.

Finally, consider giving your company's resident speechmaker Speech Master (\$15), a HyperCard stack. You paste in the text of the speech, and the stack tells you how many minutes you'll be on the podium droning away. Good way to give some gasbag a hint. (Perhaps you'd best be a *secret* Santa on this one.)

System 7 Pack

IF ONE OF YOUR BUDDIES IS CONTINUALLY complaining about how System 7 makes the Mac slower, gift-wrap this little shareware beauty from Insanely Great Software and toss it under the tree. Written by teenage New Jersey wunderkind Adam Stein (whose shareware act is so together that he has an 800 number and takes credit cards), System 7 Pack clobbers a bunch of System 7 annoyances: (1) it speeds up file-copying in the Finder by three times; (2) makes windows open faster; and (3) adds a Quit menu to the Finder, so you can reclaim that precious 300K of memory when you're juggling programs. What I find fascinating is that several commercial-software companies—no doubt aghast at the low cost of this

profoundly useful shareware morsel—have rushed into the market with shrink-wrapped imitations. I say dial up America Online (or hie thee to a user group) and get the original (\$29.95 requested).

(And if your mom, like mine, would say that handing over a gift-wrapped floppy disk rates a tad too high on the tackiness scale, consider Scotch-taping the disk to a nice box of chocolates.)

Beyond CyberPunk

JUST AS RUMORS OF HYPERCARD'S demise started cropping up at Macworld Expos, somebody came along and injected fresh weirdness into the stack world. Beyond CyberPunk (The Computer Lab, \$29.95) is an obvious labor of love: a 5-megabyte HyperCard voyage through the technofuturistic minimovement known as cyberpunk, where counterculture meets high tech, *Max Headroom* meets *Brazil*, and small-circulation cult magazines fan the flames.

This sound effects-laden, graphically intense electronic book contains a series of essays on cyberpunk. The article topics vary dramatically between fact and fantasy; real world and future world; movies, modems, art, the future, comic books, sci fi, and so on. The only common traits among authors are (1) a fascination for high tech; (2) a belief that (*Blade Runner* director) "Ridley Scott is God," as the stack puts it; and (3) an unshakable belief that there's an apostrophe in the possessive word *its*. No matter; in its childlike wonder, it's fascinating and fun.

Crisp Mountain Apples

THIS IS THE GIFT FOR THE MAC OWNER who'd consider a computer-related gift to be a wee bit on the geeky side. It's a 5-pound box of apples (we're talking actual fruit, here, the kind that Steve Jobs ate in elementary school). It's not a pun or anything—just *really* huge, juicy, unblemished, hand-packed, air-expressed, perfect, shiny apples for which you will be profusely thanked. I couldn't resist mentioning them (Harry & David, \$19.95).

Bundle the box with a QuickTime movie of yourself in a silly Santa suit—or a Word file with a holiday poem—or a HyperCard stack that spells out your good wishes—and you've got yourself a blockbuster present that means something, doesn't cost much, and tastes pretty darned good. **m**

See *Where to Buy* for contact information.

Contributing editor DAVID POGUE wrote the ideal gift for the Mac novice—the hilarious and informative *Macs for Dummies* (IDG Books Worldwide, 1992). When it comes to self-promotion, he claims to have no shame.

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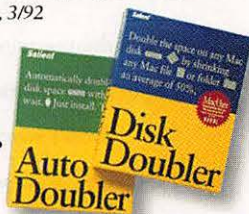
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Circle 39 on reader service card

New Products

The Latest Macintosh Releases

EDITED BY EVAN COOPER

THIS SECTION COVERS MACINTOSH PRODUCTS FORMALLY ANNOUNCED BUT NOT YET EVALUATED BY MACWORLD. ALL PRICES ARE SUGGESTED RETAIL. PLEASE CALL VENDORS FOR INFORMATION ON AVAILABILITY.

HARDWARE

AsantéPrint

An Ethernet-to-LocalTalk hardware converter that connects up to two LocalTalk devices—such as printers or network modems—to an Ethernet network. The device comes with a management application that provides managers with network statistics for diagnosing problems on the network; the software supports AppleTalk Phase 1 and Phase 2. Asanté-Print has one DIN-8 LocalTalk port and Ethernet connections for thick and thin coaxial cable or thick and 10BaseT cable. \$549. Asanté Technologies, 408/752-8388, 800/662-9686; fax 408/734-4864.

DCS 200ci

A color digital camera that features a Kodak CCD array built into a Nikon 8008s camera body with a built-in SCSI port for connecting the camera directly to a Macintosh.



DCS 200ci

The device provides autofocus, exposure control, and motorized advance and can store up to 50 images within the camera. A driver for Adobe Photoshop is included. \$9995. Eastman Kodak Company, 716/724-6888, 800/242-2424; no fax.

Ether10-T Starlet

A nine-port 10BaseT Ethernet hub that features eight 10BaseT connections and one thin Ethernet connection. The device has three LEDs for each port, that show traffic, link integrity, and collisions. The thin Ethernet connection enables users to attach the Starlet to an Ethernet backbone. \$399. Farallon Computing, 510/596-9000; fax 510/596-9020.

FastCache Quadra

A cache card for the Quadras that has a 128K zero-wait-state static RAM cache and includes proprietary QuadraBoost software designed to further increase performance. The card stores in-



FastCache Quadra

formation frequently requested by the CPU in static RAM, rather than in the relatively slow DRAM. For Quadra 700 and 900 \$299; for 950 \$449. Day-Star Digital, 404/967-2077, 800/962-2077; fax 404/967-3018.

Impala 24/96

A portable fax modem weighing 4.2 ounces that runs on four AA batteries and automatically goes into sleep mode when it is offline. The modem sends and receives faxes



Impala 24/96

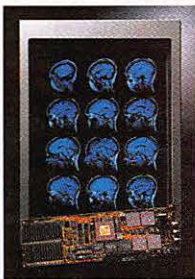
at 9600 bps and data at 2400 bps; it supports popular error-correction and data-compression protocols. Included software from STF Technologies allows users to create and edit phone books from database and word processing applications. 1MB min. memory. \$399. Omron Office Automation Products, 408/727-1444, 800/362-4411; no fax.

MacNet-NU-420

A coaxial NuBus Ethernet board for Mac II's that contains an AUI and a BNC connector. MacNet-NU-420 is IEEE 802.3 compliant, uses CSMA/CD packet passing, and has a 10 Mbps transfer rate, according to the company. The product has a lifetime warranty. \$249. MacNet, 408/954-8888, 800/486-2638; fax 408/954-8866.

Max

A display board that supports a resolution of 2048 by 1536 pixels and can display 256 shades of gray; it also includes a built-in hardware lookup table and supports NuBus block-mode cycles. The board uses the Texas In-



Max

struments 34020 Graphics System Processor, a fully programmable graphics processor. A graphics and image processing library with a variety of graphics primitives and image processing routines is bundled with the board. \$6995. Dome imaging systems, 617/895-1155; fax 617/895-1133.

NB-DSP2305

A digital signal processing and analysis board for Mac II's that, when used with any of the company's data-acquisition boards, allows systems developers to acquire analog and digital signals and to process and analyze the data. The board uses a 40MHz version of the TI TMS32C30 32-bit floating-point DSP chip that offers 40 MFLOPS of processing power, 64K of zero wait-state memory, and a NuBus master interface that can directly interface with Macintosh NuBus boards. The product ships with a library of Think C and MPW C DSP routines. \$4995. National Instruments, 512/794-0100, 800/433-3488; fax 512/794-8411.

NoteBook Keypad

A numeric keypad for the PowerBooks that has numeric keys, mathematical function keys, and arrow keys. The ADB device has a homing bump on the 5 key for touch typists, and 15 function keys. \$149.95. Kensington Microware, 415/572-2700, 800/535-4242; fax 415/572-9675.

PowerBase I

A 1-bit monochrome display adapter for the PowerBooks and compact Macintoshes that allows these computers to work with most monochrome monitors ranging from 12

inches to 21 inches in size with screen resolutions from 640 by 480 to 1152 by 872 pixels. The external device connects to a SCSI port and is also designed to function as a monitor stand. The adapter has two SCSI ports and three different video connectors. \$599. Lapis Technologies, 510/748-1600, 800/435-2747; fax 510/748-1645.



PowerBase I

PowerModem III

An internal fax modem for the PowerBooks that sends and receives faxes and data at 14,400 bps and supports many data-compression and error-correction standards. It also conforms to the Group III fax specifications and includes PSI's fax software that sends and



PowerModem III

receives faxes in the background. The software automatically wakes up the PowerBook to receive a fax, stores multiple phone books, and keeps an activity log of transmissions. \$799. PSI Integration, 408/559-8544, 800/622-1722; fax 408/559-8548.

Quad Cache

A PDS cache card for Quadras that uses 128K of static RAM to keep a

copy of the most recently used instructions and data in memory and is designed to reduce the number of CPU wait states. The card uses a unified cache architecture and comes with Cache-o-Matic cache-management software, and the company claims it is fully compatible with the Quadras' 68040 CPU. The Quad Cache 25 is designed for the Quadra 700 and 900, and the Quad Cache 33 is designed for the 950. Quad Cache 25 \$349.95; Quad Cache 33 \$449.95. Hash Tech 408/988-2646; fax 408/492-1140.

Quicktel 9624LP

A compact, 8-ounce modem that sends and receives data at 2400 bps, sends faxes at 9600 bps, and receives faxes at 4800 bps. The device supports most common error-correction and data-compression protocols. The product is compatible with all Group III fax machines and comes with BitCom and BitFax communications software and a DB25-to-DB9 converter. \$216. Logi-code Technology, 805/499-4443, 800/735-6442; fax 805/499-8588.

Vandal

A board for the Mac SE that is an accelerator and monochrome video board and includes a 68882 math coprocessor. The board is built on a 68030 processor running at 50MHz, and the included software comes with SANE routines designed to speed up math functions in applications that don't recognize a math coprocessor. With the Vandal installed, users can expand a Mac SE's memory to 16MB, and a control panel lets users *continues*

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NEW PRODUCTS

turn off the board's 030 data cache, instruction cache, and math coprocessor. The video circuitry supports resolutions of up to 1152 by 870 pixels. \$1199. Extreme Systems, 206/575-2334, 800/995-2334; fax 206/575-3928.

Ven-Tel Pocket Modem 24 with Fax

A 9600-bps fax modem that runs on an external power supply or a 9-volt battery and weighs 6 ounces. The device supports V.42 and MNP Class 10 error correction and V.21, V.22, Bell 212A, and Bell 103 protocols, as well as Group III, Class 1, and Class 2 fax standards. Quick Link II Fax communications and fax software is included. \$229. Ven-Tel, 408/436-7400, 800/538-5121; fax 408/436-7451.



ViewPort

ViewPort

A 15-inch monochrome portrait display that connects to a PowerBook via the SCSI port and can also be connected to a compact Macintosh. The monitor has a built-in 20MHz 68000 processor that handles video processing and on-board QuickDraw acceleration. The included software allows users to work on the Mac's screen and the ViewPort's screen at the same time. The monitor has a screen-refresh rate of 72Hz and a resolution of 640 by 870 pixels at 80 dpi. \$799. Mirror Technologies, 612/633-4450, 800/654-5294; fax 612/633-3136.

SOFTWARE

AXA WaterColor

A paint application designed to resemble painting with watercolors; allows users to adjust paint, water, paper wetness, and brush tools. User can preview color and water

mixtures before painting with them and can save favorite combinations for later use. Brush types like nylon bristle, airbrush, and spray gun can also be chosen. 4MB min. memory. \$79. AXA Corp., 714/757-1500; fax 714/757-1766.

Blackjack Trainer

A program designed to train users to play blackjack at a professional level, using drills that teach basic strategy and five card-counting strategies. The application can be configured to use the rules of almost any casino, and it reports playing errors and reinforces correct playing decisions. Users can run through several counting and strategy drills or play in simulation mode. 512K min. memory. \$75. ConJelCo, 412/362-2669; no fax.

Bola32 2.0

An object-oriented character-generation and presentation package for creating 32-bit antialiased text and graphic overlays for traditional video. The software lets users lay out video pages, slides, and desktop presentations, and it supports an 8-bit key/alpha channel for laying text over a live video source. The program has two NTSC color palettes, and offers texturing, video transparency, drop depth shadows, and text-rotation features. Bola32 supports Adobe PostScript Type 1 and TrueType fonts. 8MB min. memory. \$995. Avid Technology, 508/640-6789; fax 508/640-1366.

ColorPrinter Software

A printer utility that lets users generate a reference guide for a color printer that displays how the printer outputs the more than 2000 colors available in the Trumatch System. By comparing the resulting reference guide to a Trumatch Colorfinder fanbook, users can see how accurately their printer outputs these colors. Users can generate the entire 30-page guide or a single page. The Trumatch System maps the four-color process gamut in CMYK color combinations. 2MB min. memory. \$98. Trumatch, 212/351-2360; fax 212/517-2237.

Disk Go

A system extension that is designed to automatically accelerate any attached SCSI hard drive once the extension is installed in the System Folder. The software also displays the SCSI address of the hard drive on the user's desktop and puts the drive mechanism name in the Finder's Get Info box. 1MB min. memory. \$69. SoftWriters, 512/244-3999; fax 512/244-9499.

Expanded Book Toolkit

A software package that lets users create an electronic version of a book from a word processing or page-layout file; the book has the same features found in Voyager's Expanded Books. The software's options let users create annotations, indexes, tables of contents, and cross-references; it also has highlighting and page-marking capabilities, as well as wide margins and a notebook for reader comments. The built-in search feature lets readers look for first, last, and previous occurrences of a word. 2MB min. memory. \$295. The Voyager Company, 310/451-1383; fax 310/394-2156.

Exploring the Estuary

HyperCard 2.0 stack provides information about the ecology of the San Francisco Bay-Delta Estuary and the Farallones Marine Sanctuary just beyond San Francisco's



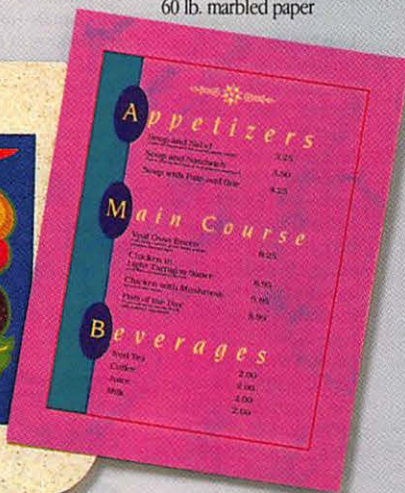
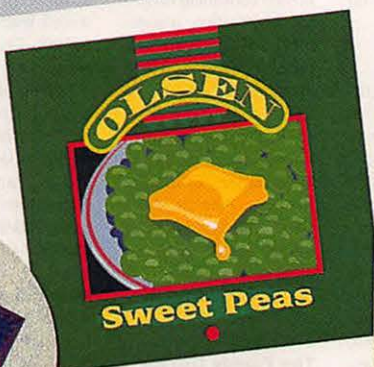
Exploring the Estuary

Golden Gate, and the impact of human activities on these ecosystems. The information is displayed on base maps with text screens and graphics. The sections cover natural history, using the estuary, bay-delta issues, and coastal resources. 2MB min. memory. \$49. Aquatic Habitat Institute, continues

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POSTSCRIPT Software From Adobe. Phaser is a trademark of Tektronix, Inc. for color printers and related products. PostScript is a trademark of Adobe Systems Incorporated which is registered in the USA and other countries. Other marks are trademarks or registered trademarks of the manufacturers or marketers of the products with which the marks are associated.

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510/231-9539; fax 510/231-9520.

LapTrack

An application that lets users track time and expenses, keep notes on how time was spent, track budgeted versus actual figures, and access client addresses. Each record, called a slip, details who performed the work, the activity, or other expense, and the client for whom it was done. The software is designed to be used on a PowerBook but also works on desktop Macintoshes. 1MB min. memory. \$79.95. Timeslips Corp., 508/768-6100, 800/285-0999; fax 508/768-7660.

MacProject Pro

Project-management software that lets users create project schedules using an integrated outlining module, manage resources and budgets for multiple projects, present plans with customized charts and reports, and share data and graphics. Using System 7's publish and subscribe and Apple events, users can share live data and graphics; 8 common project status reports and 11 project templates are included with software. 2MB min. memory. \$599. Claris Corp., 408/727-8227, 800/544-8554; no fax.



MacProject Pro

MapArt Vol. 1, Update '92

An updated version of MapArt that includes a collection of maps that reflect recently changed boundaries all over the world, including the former Soviet Union, Yugoslavia, and Germany. Half of the original 43 maps have been revised, and 8 new maps, including maps of the newly independent nations of Russia and the Ukraine, have been added. The maps are available in EPS and PICT formats. 2MB min. memory. \$179. MicroMaps Software, 609/397-1611, 800/334-4291; fax 609/397-5724.

metal

Two collections—general and animals—of PostScript images in EPS format, each with more than 200 black-and-white images. The general collection includes images of plants, tools, food, and transportation; the animal collection features drawings of a variety of animals including dinosaurs. Clip art. 1MB min. memory. \$79 each. metal Studio, 713/932-6088; fax 713/932-6087.



Nok Nok A/S

A security and accounting product for use with AppleShare servers that can keep a detailed log of server connections, disconnect idle users, reveal names of guest users, and alert administrators when log-ons occur. The program logs server activity, including the duration of log-ons, machine names, and originating log-on zones, and network and node addresses for registered users. 2MB min. memory. \$295 per server. Trik, 617/933-8810, 800/466-8745; fax 617/933-8648.

The Online Bible

An electronic version of the Bible that lets users display Biblical passages in any number of windows; search words, phrases, and wild cards; perform Boolean searches; and add notes. The text of the Bible is taken from the 1769 King James Version and is indexed to about 350,000 Greek and Hebrew words using Strong's numbers. The program can store cross-references for automatic recall, and a lexicon provides definitions of all Biblical Greek and Hebrew words. 1MB min. memory. \$30. Ken Hamel, 908/542-2533; fax 908/542-8386.

PowerPalettes

Software that contains a set of six color palettes for use in HyperCard that

enhance specific HyperCard functions. The Properties palette aids in screen design and selection of field and button properties; this palette also has moving, alignment, and spacing tools. The Pictures palette lets users open PICT images from any stack and modify their style, magnification, and location. The other four palettes are Messages, Sorter, Replacer, and Caser. 2MB min. memory. \$89. Cheshire Grin Productions, 416/896-8077, 800/668-3873; fax 416/896-0281.

Passport Producer

Software that functions as a media integrator for combining animation, digital video, MIDI files, music, and presentation graphics into multimedia presentations. Producer acts as a control center for multimedia production tools, and has the ability to link to popular authoring and editing software and import standard multimedia file types. The program's visual cue sheet works as a time line for integrating elements, and Producer uses SMPTE time code for accurate frame alignment. 8MB memory recommended. \$395. Passport Designs, 415/726-0280; fax 415/726-2254.



Passport Producer

Real Estate Connections

A package based on Danny Goodman's Connections, a personal-information manager from Concentrix Technology, that has features and databases designed for use by real estate salespeople. The program helps users manage appointments and reminders, as well as contact information; they can also create form letters and keep track of information on prospects, properties, listings, and mortgages. Runs only on Macintosh Classic II, LC and LC II, PowerBooks 140 and 170, and Quadras. 2MB min. memory. \$395. RealData, 203/838-2670,

800/899-6060; fax 203/852-9083.

Special Delivery

A multimedia integration and delivery tool that enables users to create interactive presentations using existing graphics, pictures, movies, and sounds. The program imports a variety of standard file formats and allows users to assemble the elements on interactive slides. 4MB min. memory. \$399. Interactive Media Corp., 415/948-0745; no fax.



Special Delivery

Stingers

A compilation of 98 professionally recorded and edited music clips designed for multimedia developers. Each music segment is from 2 seconds to 2 minutes long and is stored in 9 different formats, including 44.1kHz CD-audio, 22kHz AIFF, and 22kHz SND. The sounds span a variety of musical styles such as corporate, classical, industrial, and contemporary. System 7-dependent. 4MB min. memory. \$99. The Music Bank, 408/867-4756; fax 408/867-0518.

VideoMaker+

Software for use with the company's NuVista+ video board that is designed to create video productions and multimedia presentations; offers broadcast-quality special effects, wipes, blends, and blue-matte keying. The product is also compatible with QuickTime and lets users combine live video with QuickTime movies or animations. VideoMaker+ supports NuVista+ key effects, including digital chrome keying and digital linear keying. 4MB min. memory. \$295. Truevision, 317/841-0332, 800/344-8783; fax 317/576-7700.

CD ROMS

Expo CD

An interactive multimedia reference guide to the 1992 Macworld Expo in

Boston containing exhibitor information, a summary of conferences, product information, and application demos. The CD incorporates text, color graphics, sound, animation, and QuickTime movies. 8MB min. memory. Free to registered attendees; \$9.95 for others. Greg Brown Associates, 714/673-4301, 800/395-3976; fax 714/673-7127.

The Family Doctor

A family medical guide that runs in HyperCard and is based on the work of Dr. Allan Bruckheim; the CD has a section that shows an illustrated guide to human anatomy, and while viewing the illustrations users can call up recorded pronunciations of 250 body systems and parts. The guide's question-and-answer section offers advice on nearly 2000 commonly asked health questions. The product also contains almost 300 color illustrations, a glossary of more than 100 medical terms, and data on more than 1600 prescription drugs. 2MB min. memory. \$79.99. Creative Multimedia Corp., 503/241-4351, 800/776-9277; fax 503/452-5930.

The World of U.S. Manga Corps

A collection of over 100 QuickTime movies and 1000 24-bit color images of Japanese animation (or Japanimation). Movies included are Project A-ko, The Crystal Triangle, and MD Geist. The CD has a demo version of Adobe Photoshop and a multimedia application that lets users view a selection of thumbnail sketches of the images on the CD with a short description of each file. 4MB min. memory. \$49.95. Central Park Media, 212/977-7456, 800/833-7456; fax 212/977-8709.

ACCESSORIES

Custom Laser Greetings Card Kit—Holiday Edition

A package that contains templates for making custom greeting cards, Avery's label-production software MacLabelPro, and two sheets of clear laser labels; it also includes

15 different predesigned, scored, laser printer-compatible Christmas and Hanukkah cards with matching envelopes and Desktop ColorFoil transfer sheets for adding color using a laser printer. \$65.95. PaperDirect and Avery Division, 201/507-5488, 800/272-7377; fax 201/507-0817.

Mouslounge

A keyboard-mounted side tray for holding a mouse or other input device; clamps onto the edge of most keyboards. The Mouslounge has a low rail around its perimeter to keep the input device on the tray, which can be affixed to the left or right side of the keyboard. \$21.95. Armchair General, 208/733-7538; fax 208/733-7538.



Mouslounge

Traveler

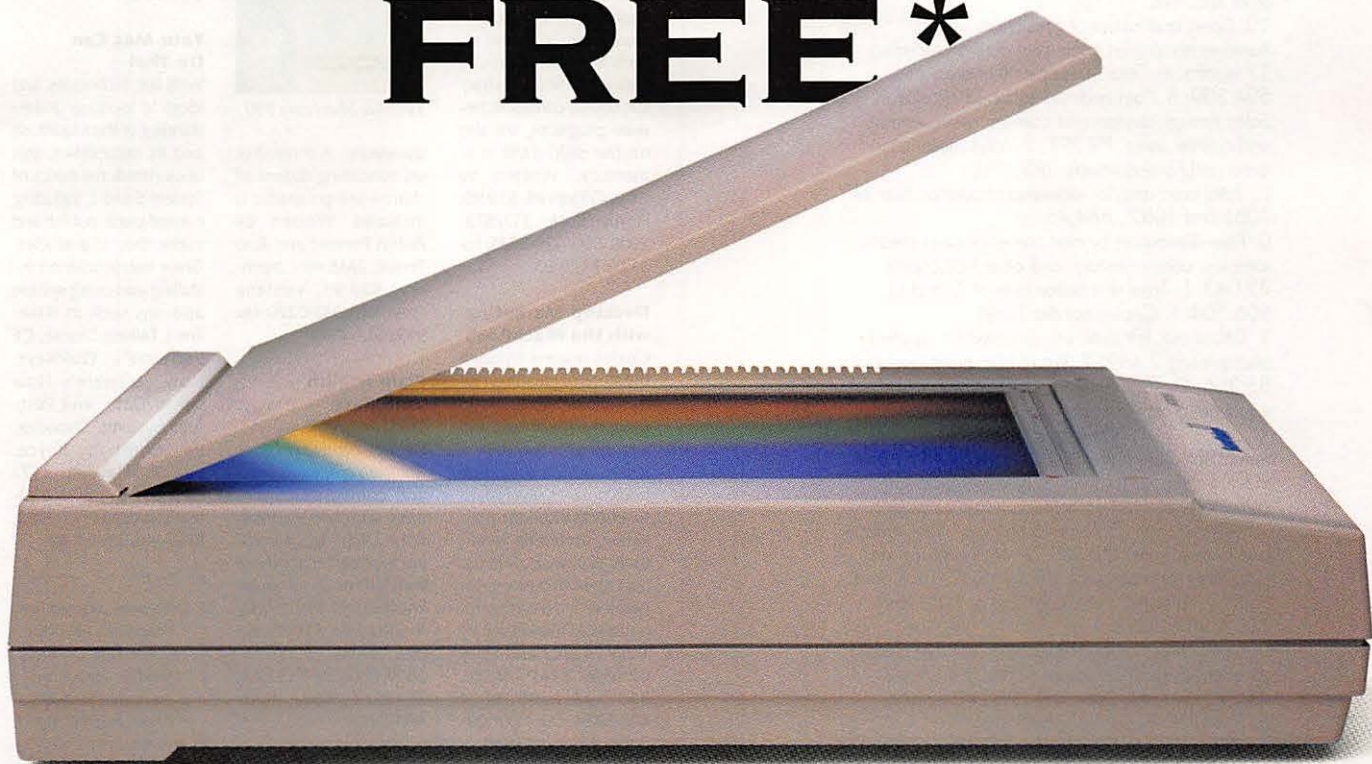
A portable voltage-surge-suppression unit that has a 6-foot detachable power cord and three offset receptacles to accommodate devices with bulky power cords. The Traveler is rated at 1600 joules, has phone and modem protection, and has power-line diagnostics that indicate surge-suppression status and wiring integrity. \$149.95. DSK, 801/224-4828; fax 801/224-5872.

BOOKS

The Color Mac: Design & Production Techniques

Coaches users in page-layout skills. Presents concepts such as resolution, scanning, color themes, and digital storage. Covers the steps of image creation and editing, as well as the basics of four-color process separations and video output. Includes matching color chart, software and hardware charts, a production chart, a glossary of terms, and examples. By Marc Miller and Randy Zaucha. \$39.95. Hayden, 317/573-2500, 800/428-continues

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1. Macworld Pub. No. 07418647
2. Date of filing: October 1, 1992
3. Published monthly
- 3A. No. of issues published annually: 12
- 3B. Annual subscription price: \$30.00
4. Known office of publication: 501 Second St., San Francisco, CA 94107
5. Complete mailing address of the headquarters of general business offices of the publisher: MACWORLD, 501 Second St., San Francisco, CA 94107
6. The names and address of the publisher, editor, and managing editor are Publisher: James E. Martin, MACWORLD, 501 Second St., San Francisco, CA 94107; Editor: Adrian Mello, MACWORLD, 501 Second St., San Francisco, CA 94107; Managing Editor: Charles Barrett, MACWORLD, 501 Second St., San Francisco, CA 94107
7. The owner is: IDG COMMUNICATIONS, INC., Patrick McGovern, 5 Speen St., Framingham, MA 01701. The names and addresses of stockholders owning or holding 1% or more of the total amount of stock are listed below.

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8. There are no known bondholders, mortgagees, or other security holders owning or holding 1% or more of the total amount of bonds, mortgages, or other securities.
 10. Extent and nature of circulation:
Average no. copies each issue during preceding 12 months: A. Total no. copies (net press run), 594,309; B. Paid and/or requested circulation: 1. Sales through dealers and carriers, street vendors and counter sales, 79,291; 2. Mail subscription (paid and/or requested), 385,170; C. Total paid and/or requested circulation (sum of 10B1 and 10B2), 464,461; D. Free distribution by mail carrier or other means, samples, complimentary, and other free copies, 42,043; E. Total distribution (sum of C and D), 506,504; F. Copies not distributed
1. Office use, left over, unaccounted for, spoiled after printing, 2,489; 2. Return from news agents, 85,306; G. Total (sum of E, F1, and F2 should equal net press run shown in A) 594,309.

- Actual no. copies of single issue published nearest to filing date: A. Total no. copies (net press run), 626,000; B. Paid and/or requested circulation: 1. Sales through dealers and carriers, street vendors and counter sales, 73,271; 2. Mail subscription (paid and/or requested), 402,968; C. Total paid and/or requested circulation (sum of 10B1 and 10B2), 476,239; D. Free distribution by mail, carrier or other means, samples, complimentary, and other free copies, 41,772; E. Total distribution (sum of C and D), 518,011; F. Copies not distributed:
1. Office use, left over, unaccounted for, spoiled after printing, 2,500; 2. Return from news agents, 105,489; G. Total (sum of E, F1, and F2 should equal net press run shown in A) 626,000.

11. I certify that the statements made by me above are correct and complete. Adrian Mello, Editor.

5331; fax 317/573-2583, 800/448-3804.

Cool Mac Animation

Introduces reader to desktop animation, video, and multimedia on the Mac. Provides overview of the art of animation, QuickTime, introductions to related software, and tips on how to avoid or solve problems. Includes disk filled with software and run-time programs, samples of Mac animations and movies, and artwork for use in creating custom animations. Written by Clint Hicks. 2MB min. memory. \$19.95. Hayden, 317/573-2500, 800/428-5331; fax 317/573-2583, 800/448-3804.

Cool Mac Sounds

A guide to recording, editing, and playing different types of sounds on the Macintosh; the book also teaches users how to control a sound system with the Mac Sound Manager and how to use the Sound Mover and Sound Wave applications. A disk with more than 36 sound effects is included; Sound Mover and Sound Extractor, sound-control shareware programs, are also on the disk. 4MB min. memory. Written by Craig O'Donnell. \$19.95. Hayden Books, 317/573-2500, 800/428-5331; fax 317/573-2583.

Desktop Marketing with the Macintosh

Guides readers through the steps of creating a direct-marketing campaign using the Macintosh and a range of software programs and tools. The book outlines seven steps for effective desktop marketing, according to authors. Explains how to use Mac for both business-to-business and business-to-household marketing. By Tracy Emerick and Stacy Gasteiger. \$34.95. Brady, 317/573-2500, 800/428-5331; fax 317/573-2583, 800/448-3804.

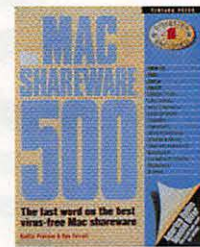
Everything You Wanted to Know About the Mac

This book discusses the genesis and development of the Macintosh, describes what's inside the machine, and gives tips and tricks for using applications. Chapters

are devoted to topics such as viruses, fonts and typography, word processing, desktop publishing, databases, spreadsheets, and games. By Hayden Development Group, edited by Larry Hanson. \$29.95. Hayden, 317/573-2500, 800/428-5331; fax 317/573-2583, 800/448-3804.

The Mac Shareware 500

A shareware catalog that also contains a collection of tips and tricks for obtaining and working with shareware, a guide to the best programs, and a shareware troubleshooting manual. Section I introduces users to shareware and discusses the ethics of the shareware community. Section II features individual chapters on different categories of



The Mac Shareware 500

shareware. A three-disk set containing dozens of shareware programs is included. Written by Ruffin Prevost and Rob Terrell. 2MB min. memory. \$39.95. Ventana Press, 919/942-0220; fax 919/942-1140.

Plain English Computer Dictionary

Defines computer terms using everyday examples and comparisons, pictures, and cartoons. Written in a light style, according to publisher, for those with little or no computer knowledge. Written by Joel Kraynak. \$10.95. Alpha Books, 317/573-2500, 800/428-5331; fax 317/573-2583, 800/448-3804.

Prides' Guide to Educational Software

A guide that lists and rates over 750 products designed for the education market, including more than 100 CD ROMs and videodiscs. The book describes products for ages from preschool to adult

and also makes hardware recommendations. In addition, it contains a history of educational software, an introduction to multimedia, and five computer-term glossaries. Each vendor is listed with address, phone number, and fax number. Written by Bill and Mary Pride. \$25. Published by Crossway Books, 708/682-4300; fax 708/682-4785.

Programmer's Guide to MPW, Volume II

A companion to Volume I that examines the tools and programming languages designed to be used with MPW and discusses object-oriented tools and techniques. Tools that are described in depth include the MPW Pascal and C compilers, the MPW assembler, and the SADE and MacsBug debuggers. Written by Mark Andrews and Neil Rhodes. \$32.95. Addison-Wesley Publishing, 617/944-3700, 800/447-2226; fax 617/944-8243.

Your Mac Can Do That

With tips, techniques, and ideas to increase understanding of the Macintosh and its capabilities, this book details the basics of System 6 and 7, including cut and paste, publish and subscribe, and aliases. Gives instructions on installing and using system add-ons such as Baseline's Talking Moose, CE Software's QuickKeys, Now Software's Now Up-to-Date, and Portfolio Systems' Dynodex. By Christian Boyce. \$24.95. Hayden, 317/573-2500, 800/428-5331; fax 317/573-2583, 800/448-3804. **m**

To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, Macworld, 501 Second St., San Francisco, CA 94107. Macworld reserves the right to edit all product announcements.

Questions and Tips from Macworld Readers

BY LON POOLE

YOU CAN PROBABLY IMAGINE times when hearing Darth Vader say, "What is thy bidding, master?" while your Mac starts up would not be politically correct. You can suppress the playing of sounds and the opening of all other items in System 7's Startup Items folder by pressing the shift key when the Finder's menu bar appears, as mentioned in a tip last August. Once the opening of start-up items has begun you can cancel it by pressing ⌘-period, notes Clint Beilman of Kissimmee, Florida. The Mac immediately stops any sound it was playing and skips all start-up items it has not already opened. If you press ⌘-period while the Mac is opening an application, document, or desk accessory from the Startup Items folder, the Mac finishes opening that item and ignores all other start-up items. Pressing ⌘-period also stops any sound you started playing by opening its icon in the Finder. If your Mac disturbs other people by beeping when you start it or restart it, you can quiet it by plugging headphones or an earphone into the speaker jack.

Electrical Update

THE TABLE "POWER NEEDS" IN APRIL'S *Quick Tips*, which lists the electrical requirements of most Apple Macintosh-related products, contains a couple of errors. The table correctly includes the Mac IIsi in the group of products that need no isolation step-down transformer for 220/240 volts, but lists the wrong voltage range; the correct range for the IIsi is 100V–240V AC. Örjan Larsson of Karskoga, Sweden, spotted a more serious error: Apple's 12-inch color monitor, which was discontinued in October, does require an isolation step-down transformer for 220V/240V power. The table lists the monitor in the wrong section, though it does correctly state the monitor's power range, 100V–120V. Before plugging in any electrical equipment outside the country where it was originally sold, double-check the nameplate or owner's manual and make sure the local electric-

ity falls within the equipment's voltage and frequency ranges.

Simplified Registration

AUGUST'S METHOD OF CREATING REGISTRATION and crop marks in Aldus FreeHand requires more work than necessary when making a process-color separation, writes Kathy Doogan of Anchorage, Alaska. She says you needn't go to the trouble of duplicating the registration or crop mark, assigning each duplicate one of the four process colors, then aligning all four. Instead, create a new color made of 100 percent black, 100 percent cyan, 100 percent magenta, and 100 percent yellow. Apply this new color to a single registration mark, and the mark will appear—perfectly aligned—on each separation.

Merging in Mariah

IF YOU USE MARIAH FROM SYMMETRY Software (602/998-9106) to organize multimedia databases and want to combine several of them, *Macworld* associate editor Dan Littman suggests you use the New From Gather command, select the databases (Collections) you want to combine, and type **all** in the keyword field. If you don't know this trick (and Symmetry tech support says it's not documented), you'll try using specific keywords from your collections. Since you can search for only three keywords at a time, and since most images have more than one keyword, you'll spend hours importing over and over, only to end up with multiple copies of many of the images.

Stack and Heap Collisions

Q. I have one problem with my Mac Classic. Every time I quit a program I get a system error message that reads "Stack collision with heap." I have to restart the computer before starting another program. What can I do to fix my wonderful machine?

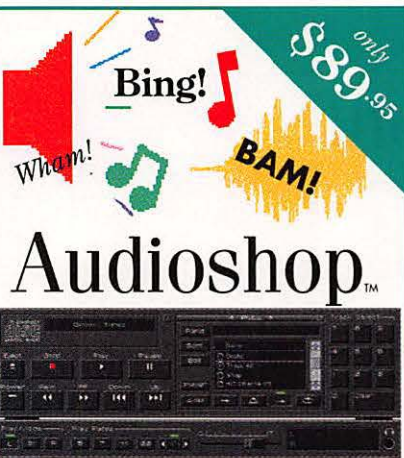
Curt D. Baker
Address unknown

A. The heap and stack are two parts of the memory partition that System 7 (or System 5 or System 6 with MultiFinder active) allocates to a program. The heap stores the program instructions and the definitions of windows, menus, dialog boxes, and other program resources, while the stack stores program variables and parameters. The heap and the stack start at opposite ends of the program's memory partition with some amount of available memory between them. As you use the program, the stack and the heap grow toward each other. The Macintosh system software keeps the heap from overrunning the stack but cannot prevent the stack from clobbering the heap. That's because the stack is controlled independently by the central processor, which enlarges and shrinks the stack according to the needs of each program instruction. However, the system software does monitor the respective sizes of the stack and heap. Every 1/60 of a second the system software checks to see if the stack has overrun the heap, and if it has, the system displays the error message you are seeing. Although 1/60 of a second may seem like no time at all to you, the central processor can execute thousands of instructions in that time. Software engineers must carefully design and test programs to make sure their instructions don't cause the stack to overflow into the heap.

The immediate solution to your problem is to increase the program's memory size—before opening or after quitting the program—in its Info window, which you access by selecting the program's icon and choosing Get Info from the Finder's File menu. Increasing the memory size by 50K might be enough; if not, try 100K or 150K. In the long term, your trouble may be cured by upgrading the program to a more recent version. Because no well-written pro-



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gram crashes regularly and predictably, you should definitely report the problem to the program's publisher.

StyleWriter Background Printing

Q. My Mac IIsi is now tied up each time I print on my StyleWriter, sometimes consuming significant time. I need some type of printer buffer. My Apple dealer has no solution to this problem. Can you recommend one?

*Phillip Moultrie
Hoover, Alabama*

A. Apple's current StyleWriter driver software, version 7.2.2, can print in the background with System 7 or with System 6 while MultiFinder is active. As a bonus, version 7.2.2 is much faster than versions 7.1 and earlier. StyleWriter 7.2.2 comes on Apple's System 7 Tune-Up disk (described in last month's *Quick Tips*). At this writing, the latest four-disk set of StyleWriter Installation software includes a slightly older version of the StyleWriter driver, version 7.2. You can get the Tune-Up disk from Apple dealers, user groups, and online information services.

If you use System 7.0 or 7.0.1, you install the StyleWriter driver with the Installer program as part of a complete tune-up. If you use System 6, you can install StyleWriter 7.2.2 by dragging it from the Tune-Up Parts folder on the Tune-Up disk to your System Folder. For background printing with System 6, the System Folder must also contain the MultiFinder, Backgrounder, and PrintMonitor software, which all come on the System 6 installation disks.

To use background printing, open the Chooser, click the StyleWriter icon, and turn on Background Printing. Thereafter, every Print command will automatically spool documents to disk for later automated printing in the background.

If you use System 6 without MultiFinder you can still print in the background on a StyleWriter, ImageWriter, LaserWriter, or another printer. Instead of using Apple's PrintMonitor and Backgrounder software, use SuperLaserSpool from Fifth Generation Systems (800/873-4384 or 504/291-7221). SuperLaserSpool also works with MultiFinder active and with System 7.

Dot Matrix Printing

Q. I have five dot matrix printers, some 9-pin and some 24-pin, made for MS-DOS computers. I would like to use them with Macs and PowerBooks—on an AppleTalk network if possible. The ads for The Grappler from Orange Micro (714/779-2772) state it can convert MS-DOS printers for use with

Macs. Is it merely a question of cabling, drivers, and DIP switches, or is something else involved?

*Richard Cacciato
New York, New York*

A. Both The Grappler from Orange Micro and PowerPrint from GDT Softworks (604/291-9121 or 800/663-6222) let you use a variety of printers having IBM-style parallel interfaces with a Macintosh serial port. I haven't seen PowerPrint in action, but GDT claims the latest version, 2.0, works with over 1000 printers—9-pin, 24-pin, laser, ink-jet, and thermal. This means a PowerBook user on the road can print to almost any handy printer, not just a Macintosh printer.

I have seen two Grappler models demonstrated. Orange Micro claims The Grappler IIsi works with many specific 18- and 24-pin dot matrix printers, ink-jet printers, laser printers, and any printer that's compatible with an Epson LQ or a Hewlett-Packard LaserJet printer. The Grappler II 9Pin reportedly works with many specific 9-pin dot matrix printers and with any printer that's compatible with an IBM ProPrinter or an Epson EX, FX, or JX printer. According to Orange Micro, both Grappler models work with TrueType and Adobe Type Manager for smooth text at any size. They print QuickDraw graphics but not PostScript graphics or PostScript font effects such as rotated text and curved text. These claims and observations apply only to The Grappler IIsi and II 9Pin; older models may work differently.

The PowerPrint works with one Mac at a time, but both Grapplers allow a printer to be shared on a network. The Mac to which the printer is connected acts as a host, spooling print jobs on its hard drive and printing them in the background when it's not busy. Because The Grappler background printing has a very low priority, the host's foreground performance isn't degraded (except on slower Macs like the Plus, SE, and Classic).

To install The Grappler, you plug it into the printer and its cable into your Mac's printer or modem port. You drag a standard ImageWriter LQ driver (a plain ImageWriter driver for The Grappler II 9Pin) and a Grappler control panel (also called a cdev) into the System Folder. The control panel lets you control background printing, and with a IIsi you use the control panel to specify the printer type. With a II 9Pin you specify the printer type by setting switches on The Grappler itself.

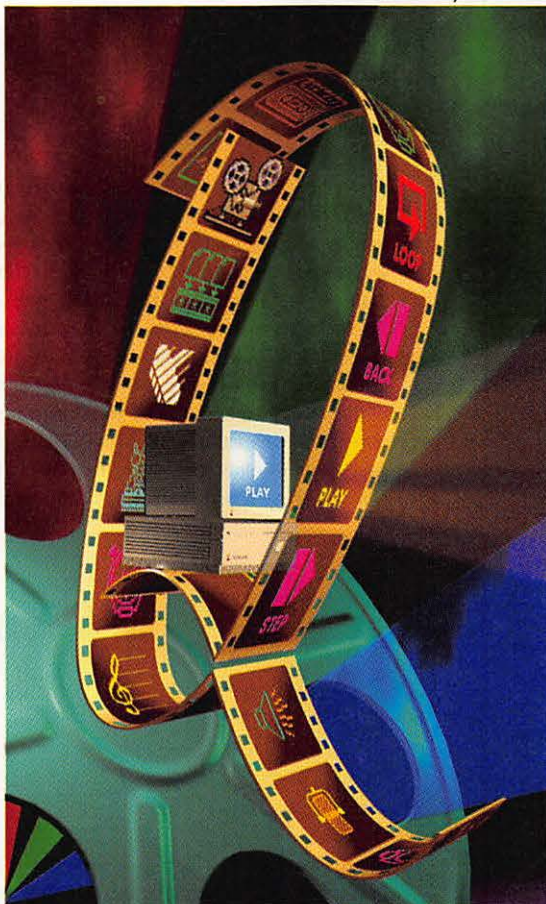
To use a printer connected through The Grappler, you open the Chooser, see-
continues

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lect the ImageWriter LQ icon (or ImageWriter icon, for a II 9Pin), and select the proper port. Your programs think they are printing to an ImageWriter LQ (or ImageWriter); The Grappler's software and hardware handle the translation to the MS-DOS printer.

Drag, Drop, and Copy

TIP One of Word 5's best features is drag and drop, which allows you to move text with more ease than cut and paste. You can also copy text using this method. Just press the ⌘ key when you begin dragging; the original text doesn't move and Word places a copy of it wherever you drag to. This method also works in Excel 4.

*Michael N. Witman
New Britain, Connecticut*

Living with Unclean Programs

TIP Those of us fortunate enough to have more than 8MB of RAM naturally have 32-bit addressing turned on in System 7's Memory control panel. Otherwise we couldn't use all that memory. Problem: There remain programs (none would be games, mind you) that are not 32-bit clean. They do not work if the Mac puts them in the area of memory above 8MB, which it may do if 32-bit addressing is on.

Here's a workaround: Use the Finder's Get Info command to set a 32-bit-clean program's memory size large enough to occupy all remaining memory above 8MB. To calculate the smallest size that works, subtract 8MB from the size of the largest unused block of memory, which the Finder's About This Macintosh command reports. After setting the memory size and closing the Info window, open the 32-bit-clean program; it consumes all remaining RAM that requires 32-bit cleanliness. Now when you open your 32-bit-not-so-clean program, the Mac puts it in the bottom 8MB of memory, which doesn't require 32-bit cleanliness.

This technique has always worked for me because the Mac allocates memory to applications from the highest memory addresses (which require 32-bit cleanliness) toward the lowest. It's one great way to allocate nearly a full 8MB of RAM to the game Spaceship Warlock, not that I would know personally.

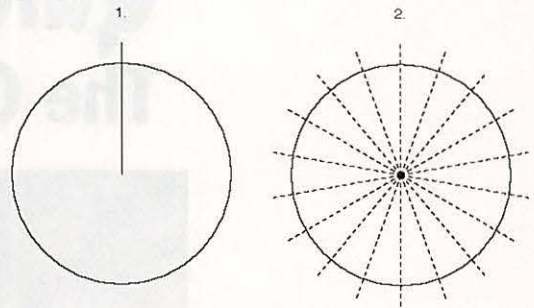
*Dave Curtin
Orange, Connecticut*

The system software always occupies the lowest memory addresses of the bottom 8MB (typically the first 1MB to 4MB), so you never have a full 8MB in which to open programs that aren't 32-bit clean. With 32-bit addressing turned off, the Mac can't

Scallops à la Michelin

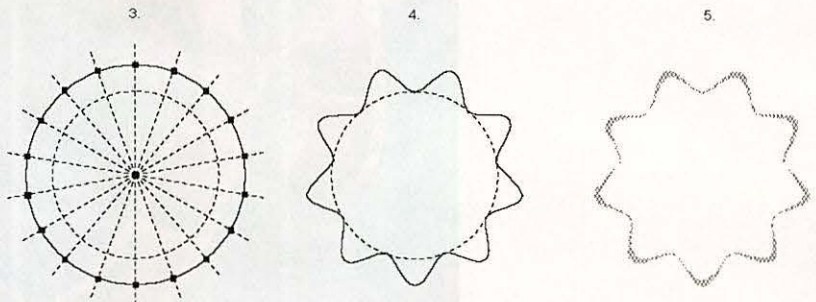
Here's a quick way to make a good scalloped border with Adobe Illustrator, contributed by Carla Michelin of New York.

1. Draw a circle the appropriate size, and draw a radius that extends beyond the circumference of the circle.
2. Make additional radii to see where the scallops will fall, one radius for each "peak" and one for each "valley," and make them guide lines.



Here's how. Select the radius you drew, choose the Rotate tool, press the option key, and click the center of the circle to bring up the Rotate dialog box. In it enter a rotation angle equal to the circle's 360 degrees divided by twice the number of peaks you need, and click the Copy button. Next duplicate more radii by using Illustrator's Transform Again command repeatedly until you have radii equally spaced throughout the circle. Then select all the radii and use the Make Guide command.

3. Decide how deep you wish the valleys to be, then draw a second circle, with the same center point as the outer circle—the edge of the inner circle should be at the low point of the valleys. Now make the inner circle a guide. Then add anchor points along the outer circle where the radial guide lines intersect it. To add anchor points, choose the Add-Anchor-Points tool (from the Scissors tool's pop-up menu), and click with it. Now you have a circle with a number of anchor points around it.



4. To get the scalloped effect, you scale alternate anchor points (the valley points). First choose the Direct Selection tool (from the Selection tool's pop-up menu), hold down the shift key, and click—or drag a selection rectangle around—the anchor points where you want valleys. Then choose the Scale tool, press the option key, and click the center of the circle to bring up the Scale dialog box. In it enter a uniform scaling percentage equal to the diameter of the inner circle divided by the diameter of the outer circle times 100 (or estimate the percentage by eye), and click OK. Depending on the number of peaks and valleys, you may have to delete some or all of the anchor points at 0 degrees, 90 degrees, 180 degrees, or 270 degrees on the circle to get complete regularity.
5. You can combine several scallops to get interesting effects. For example, you can get a varied-width scalloped border by duplicating a scallop, reducing and rotating the duplicate, aligning the duplicate and the original at their centers, filling the original with a color, and filling the duplicate with white.

use more than 8MB of RAM, and the About This Macintosh command accounts for all unusable memory (that portion exceeding 8MB) by reporting it as part of the system software memory.

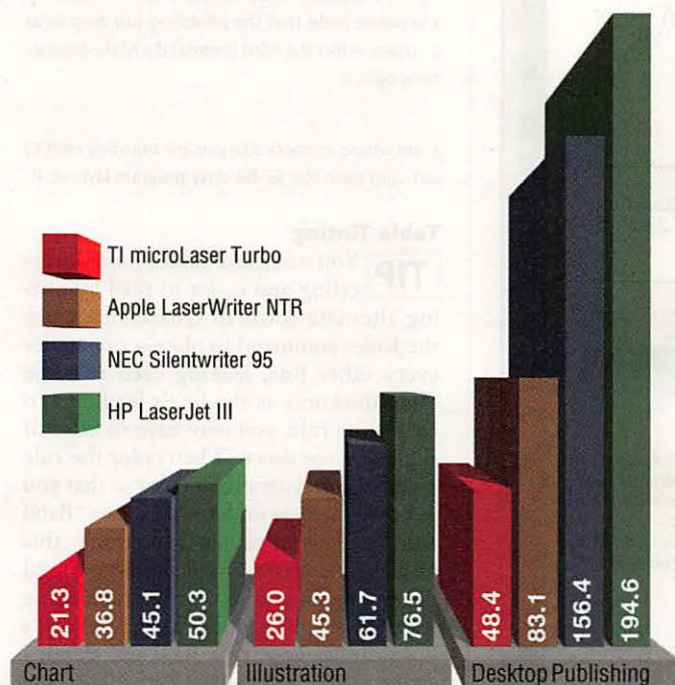
This trick may not work if your Mac's memory has become fragmented. Memory fragmentation can occur when you have opened and quit several programs, but have never quit all programs, since you

last restarted the Mac. If so, there may be a block of memory available in the area of memory requiring 32-bit cleanliness that is smaller than the largest block available but large enough to open the 32-bit unclean program. You can avoid memory fragmentation by quitting all open programs (or restarting the Mac) and reopening the programs. Open the pro-

continues

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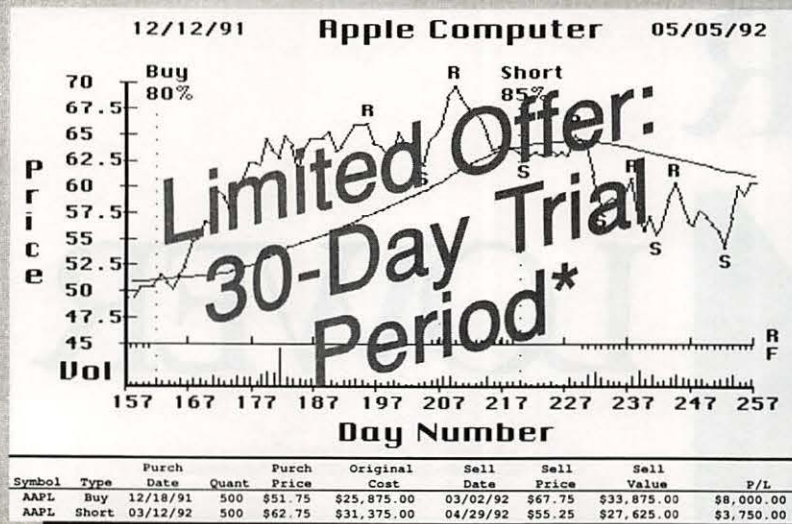
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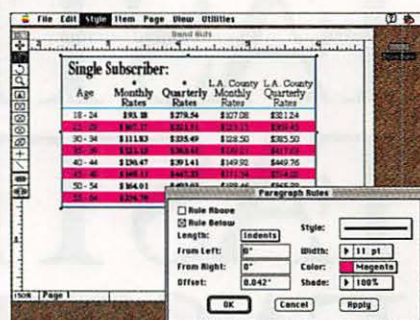
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Band Aids Tinted bands aid in reading a table. These were created with the QuarkXPress Rules command, by setting its dialog box options as shown (the width is the same as the type's leading). To have QuarkXPress print the magenta bands on a separate plate that the printshop can drop in as a screen, select the Print command's Make Separations option.

gram whose memory size you are adjusting next to last, and open the 32-bit-dirty program last.—L.P.

Table Tinting

TIP You can make tables more interesting and easier to read by tinting alternate rows. In QuarkXPress use the Rules command to place a rule under every other line, making each rule the same thickness as the line's leading. To center the rule, you may have to offset it slightly up or down. Then color the rule a shade of gray or a light color so that you can read the type underneath it (see "Band Aids"). The advantage of using this method, compared with drawing tinted lines or rectangles, is that the rules move with the text when you change the text's position, leading, type size, and so on. I assign a style to the bars (actually to the ruled text) and keep it in my style sheet so that I can change the leading and color the bars universally. The first line of the table, and every odd line after, has a style I named "line," and even lines have a style I named "copy."

Kevin Hughes
Fountain Valley, California

We pay from \$25 to \$100 for tips published here. Send questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to *Quick Tips*, Lon Poole, at the addresses listed in *How to Contact Macworld* at the front of the magazine (include your address and phone number). All published submissions become the property of *Macworld*. Due to the high volume of mail received, we're unable to provide personal responses. **m**

LON POOLE answers readers' questions and selects their tips for this monthly column. His two most recent books are *Amazing Mac Facts* (Microsoft Press, 1991), a collection of the best published tips; and *Macworld Guide to System 7* (IDG Books Worldwide, 1991).

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Downloading Freeware and Shareware

BY JIM HEID

YOUR MACINTOSH IS BUT A phone call away from a vast library of free and inexpensive software. All you need to tap into the world of *freeware* and *shareware* is a setup consisting of a telephone modem, a communications-software package, and a subscription to an online information service.

What kind of software is out there? You name it. Utilities that check your system for viruses and others that compress files to save disk space. Fonts, programs that modify fonts, and programs that print font samples. Programs that display a digital clock in your menu bar, that synchronize your Mac's clock with the government's atomic clock, and that let your Mac speak the time when you press a key.

You have a PowerBook? You'll find utilities that help you locate the pointer on a dim screen, that automatically dim the display after a few minutes to save battery power, and that let you put the hard drive to sleep with a single keystroke.

You want fun? How about a program that lets the Mac play different sounds when you insert or eject disks, empty the Trash Can, and perform other activities? And sounds themselves—you will find clips from "Star Trek," *Terminator II*, "Twin Peaks," "Ren and Stimpy," "The Simpsons," George Bush, and other cartoon characters—more sounds than you have disk space for. And that goes double for QuickTime movies.

There's also plenty for the serious-minded—for instance, a full-featured spreadsheet program as well as spreadsheet templates for loan amortization, investment analysis, and more. HyperCard buffs will find stacks galore, from one that tracks your videotape collection to a mixology stack of 137 drink recipes.

The shareware system illustrates the generosity and sense of community you'll find online. You can *download* a shareware program from an online service and try it out for a week or two. If you find it useful, send a check to the author. In return, you often get a printed manual (most shareware programs come with on-screen

documentation) and a disk with the latest version of the program. Payment usually ranges from \$5 to \$50, although some programmers prefer other forms of remuneration. One programmer asks for a postcard from your home town; another requests a donation to UNICEF; another wants \$25 or a case of beer; still another requests Grateful Dead concert tapes.

Freeware doesn't cost a cent (aside from the cost of the phone call and the information service's connect-time charge—two charges that almost always apply when you're online). But don't get the idea that a free program isn't worth anything. The best virus-detection utility (Disinfectant) is free, as is a popular utility (Extension Manager) for managing System 7 extensions—those files that load into memory during start-up, displaying their icons along the bottom of the screen. Freeware programmers are often inspired by fellow subscribers—on Friday, someone might ask if a certain kind of program is available; by Monday, it often is.

Downloading software from an information service is fairly easy, although there are a few technical hurdles that can trip up novices. This month, I'll describe the key technicalities behind downloading and show how to download from two services: CompuServe and America Online. If you don't have a modem, see "How to Buy a Modem," *Macworld*, August 1992, for details on what to look for.

About the Services

WITH OVER 500,000 SUBSCRIBERS, CompuServe is the largest information service. You can access it with general-purpose communications programs such as Hayes's Smartcom II, Software Ventures' MicroPhone II, and The FreeSoft Company's White Knight. I'm partial to Smartcom II; it's straightforward and powerful. Real communications fiends may prefer MicroPhone II or the legendary White Knight, whose folksy look-and-feel reveals its shareware origins.

Both programs provide more communications features and more-sophisticated *scripting languages*, which let you automate communications.

Seen through any of these programs, CompuServe looks like a relic from a user-interface museum. Instead of using pull-down menus, icons, and the like, you type commands in response to text menus. It isn't easy, but it is efficient—you can navigate the system quickly once you get the hang of its menus.

An easier way to access CompuServe is to use CompuServe Information Manager (CIM), a program that puts an icon-based graphical user interface (GUI) between you and CompuServe's mainframe computers (see "CompuServe Two Ways"). When you click on CIM's icons and choose commands from its menus, the program transmits the text commands CompuServe expects.

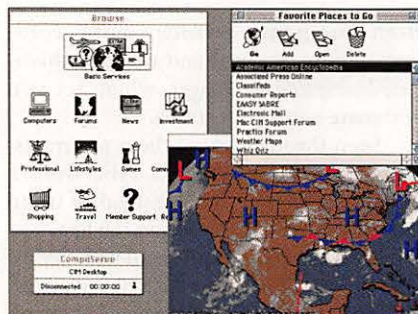
CIM works reasonably well, but its friendly interface isn't as smooth and polished as America Online's. This relative newcomer to the online scene has about 180,000 subscribers and relies on its own, strictly graphical communications software, which you can receive gratis by calling 800/827-6364, extension 5547. America Online lacks many of the specialized services available on CompuServe, but by and large, America Online is just as

good a source for software. Good software travels quickly in the online world; a hot program that debuts on one service is usually quickly *uploaded* to other services.

Both CompuServe and America Online offer many services apart from their software libraries: wire-service news, electronic mail, encyclopedias, and hobby forums for everything from tropical fish to ham radio. In addition, America Online offers an electronic link to *Macworld*—the Macworld Online forum, where you can read news and reviews from back issues and correspond with *Macworld* editors.



*How to
expand your
software
library—over
the phone*



CompuServe Two Ways Top: CompuServe as it appears through Hayes's Smartcom II. Bottom: CompuServe as seen through the CompuServe Information Manager program. National and regional weather maps and forecasts are available on many online services. (To display maps with CIM, double-click on the Weather Maps entry in the Favorite Places to Go window.)

tors, contributors, and fellow subscribers. If you sign on, drop me a line—my address is JimHeid. I'm also on CompuServe as 76174,556. I'll leave you to explore these aspects of online life; after all, we're here to scarf up software.

First Steps

GETTING SET UP TO DOWNLOAD software involves several steps. First, you need to configure your communications software settings to match those of the remote system. That means specifying a phone number to dial (the starter kits for commercial services include a list of them) as well as various communications settings, including the data-transmission rate—often called the *baud rate* or *bit rate*—which is usually 1200 or 2400 bps (bits per second). (Modems that operate at 9600 bps are also available, but few information services support such fast connections. Look for this to change in the next year or so.) Generally, you configure communications just once, before you sign on for the first time.

Both Smartcom II and MicroPhone II include canned, properly configured *settings files* for CompuServe, as well as a variety of *scripts* that automate access to CompuServe. (An automatic log-on script, for example, dials the modem and supplies your ID number and password.) If your telecommunications program doesn't have these canned settings files,

configure your communications settings to 7 data bits, 1 stop bit, even parity, and the fastest speed your modem supports (usually 1200 bps or 2400 bps). These basic settings ensure that your modem and CompuServe's will be able to connect.

The CompuServe membership brochure that accompanies most communications programs includes a temporary ID number and password you can use to sign on for the first time. The America Online software automates the sign-on process—simply start the program and follow the on-screen directions. (Have a credit card handy—you'll need it to supply billing information.) CompuServe Information Manager's Signup works similarly.

Before the Download: Choosing a Transfer Protocol

ACCURACY IS PARAMOUNT WHEN DOWNLOADING software, since even one missing or garbled bit will render a downloaded program useless. If you're using a general-purpose communications program, you need to perform another step before downloading: you must choose a *file-transfer protocol*. That's a three-dollar phrase, but it simply refers to a set of rules that both computers use to ensure that a file is transferred accurately.

With a file-transfer protocol, the sending computer (in this example, CompuServe's mainframes) sends the file in chunks called *blocks*. When the Mac receives a block, it compares notes with CompuServe to make sure the block was received accurately. If it wasn't, the Mac requests the block again. If it was received accurately, the Mac gives the go-ahead to send the next block. This Did-you-get-it-Yes-I-did banter continues until the entire file has been transferred.

Several file-transfer protocols exist—XMODEM, YMODEM, ZMODEM, Kermit, CompuServe A, CompuServe B, MacTerminal. There are even variants within each particular type of protocol—XMODEM-CRC, XMODEM-1K, CompuServe B Plus. All the text-oriented services, such as CompuServe, support XMODEM. MicroPhone II, Smartcom II, and White Knight all support XMODEM, YMODEM, ZMODEM, and their variants as well as Kermit; but only Smartcom II supports the CompuServe B Plus protocol.

Each protocol and variation thereof uses different block sizes, different error-checking techniques, or both. For example, the original XMODEM uses a small 128-byte block size, while XMODEM-1K uses large 1024-byte blocks. This larger block size means the online service spends less time asking your Mac if things are OK, and more time

transmitting the file. The downside: If the phone lines have too much *noise* (electronic interference), the transmitting computer has to spend more time resending blocks. Small block sizes are best for noisy connections, while large block sizes are best for clean connections. If you've chosen a protocol that uses a large block size and you find you're getting a lot of *retries*—retransmitted blocks—during a download, chances are you have a noisy connection and could benefit from choosing a protocol that uses a smaller block size.

In the end, the underlying details behind these protocols aren't important. What is important is that you set up your program to use a transfer protocol that the sending computer also supports. I recommend starting out with XMODEM. As you become an experienced downloader, you might want to experiment with other protocols to see if they reduce downloading times, and if so, by how much. If you use CIM or America Online, you don't have to fuss with transfer protocols. CIM automatically uses the CompuServe B Plus protocol, while America Online uses its own transfer protocol.

How to: Smartcom II Choose File Transfer Protocol from the Settings menu. In the dialog box that appears, select the XMODEM Standard button and check the Auto-Receive MacBinary option. If you want downloaded files to be stored in a specific folder, click on the Select button and then choose the folder.

How to: MicroPhone II Choose Protocol Transfer from the Settings menu. From the Protocol pop-up menu, choose XMODEM.

How to: White Knight From the Options submenu under the Customize menu, choose X-Y-ZMODEM. In the dialog box that appears, be sure XMODEM-Classic is selected.

Downloading from CompuServe

ONE WAY TO LOCATE FILES AVAILABLE for downloading is to go into a specific forum (such as one for games, sounds, or fonts) and then look around. Let's say you want to see what's been added to the arcade and action games section of the games forum within the last week. From any CompuServe menu, type **go macfun** and press the return key. When the forum menu appears, type **3** and press return to enter the file libraries. When the menu of libraries appears, type **2** and press return to enter the Arcade/Action Games library. Finally, type **cat/des/age:7** and press return. This displays a catalog (**cat**) and description (**des**) of files added within the past seven days (**age:7**).

continues



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You can add a *keyword* to narrow your search; for example, **cat/des/age:7/key:poker** searches for week-old poker games. Keywords let you search for descriptive words assigned to the file when it was originally uploaded. Omit the **age** portion of the command to search all files regardless of when they were uploaded.

The file descriptions include a variety of information, but the most important information is the file name as it's stored on CompuServe's computers. When you've found a file you want to download, you'll type this name.

Say you want to download a file called Ataxx (see "Deciphering CompuServe Descriptions"). At CompuServe's **Enter choice!** prompt, type **dow ataxx.cpt** (**dow** is for *download*) and press return. You'll see a menu of available file-transfer protocols. Type **1** and hit the return key to choose the XMODEM protocol, and then tell your program to begin receiving as follows.

How to: Smartcom II Click on the Recv icon. When the Receive A File dialog box appears, choose a disk or folder for the received file, and then click on Begin or press return. (You needn't type a name for the file; CompuServe will supply the name during the download.

How to: MicroPhone II Choose Receive from the Transfer menu. In the dialog box that appears, choose a disk or folder for the received file if you like, and then click on Receive or press return.

How to: White Knight Choose XMODEM Protocol from the File menu's Receive File Using submenu. To specify where a file will be stored, use the File menu's Received File Destination command before downloading.

CompuServe also provides a file-finder feature that lets you automatically search all Mac forums at once instead of entering each forum. This is handy if

you're not sure where a certain type of file might be. To access CompuServe's file finder, type **go macff** and hit the return key at any CompuServe menu. The file finder lets you search by numerous criteria—submission date, forum name, and so on—but you'll probably find the keyword option the most useful.

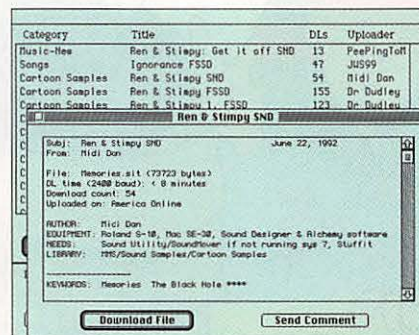
The main drawback of CompuServe's file finder is that you can't directly download a file that it has found; instead, you need to jot down its name and location, and then move to that forum to download it using the techniques just described. This drawback doesn't apply if you're using CompuServe Information Manager.

Downloading from America Online

AS YOU CAN SEE, ACCESSING COMPU-SERVE using a general-purpose communications program means typing your way through a maze of text menus. CIM streamlines the process, but it's still clunky compared with America Online.

As with CompuServe, you can locate files on America Online by visiting each forum or by using a file-search feature. To jump directly to the software libraries, choose Keyword from the Go To menu, type **software**, and click on OK. This displays the Software Libraries window, whose first entry is File Search. Double-click on File Search and the file-finder window appears (see "Finding Online").

America Online also offers fast access to the most popular downloads. In the Software Libraries window, double-click on Macintosh—Top Downloads to display a window of the current month's most popular downloads. If a given file sounds interesting, double-click on its entry to display a description window. To download the file, click on the description window's Download File button and then specify a location for the file. America Online lets you know how much time



Finding Online America Online's file finder makes locating files easy. Top: On the prowl for digitized Ren and Stimpy sounds (note the keyword). Bottom: The File List window (in the background) lists files located by the file finder. Double-clicking on an entry opens another window containing a description of the file and a button for downloading it.

downloading will take, and when it's done, a digitized voice announces, "File's done."

America Online 2.0, released last summer, also lets you mark a group of files for deferred downloading. Instead of downloading files one by one, simply select them all, and America Online downloads them in one fell swoop.

After the Download: Decompressing

ONCE YOU'VE DOWNLOADED A PROGRAM, you'll probably be eager to try it out. But there's still one more task to perform. Files downloaded from an online service are stored in a *compressed* form that takes up less disk space and, more important, requires less time to upload and download. The person who uploaded the file used a file-compression utility such as Aladdin Systems' StuffIt series, Fifth Generation Systems' DiskDoubler (formerly from Salient), or Bill Goodman's Compact Pro to create what's often called an *archive*—a single disk file that contains one or more files that have been compressed. Before you can try out the programs you've downloaded, you must *decompress* them to their original form.

The compression utilities I just mentioned have the ability to create *self-extracting archives*—archive files that you can decompress without a copy of the compression utility. These days, many programs and files available on information services arrive as self-extracting archives. You can recognize such a file by looking

Deciphering CompuServe Descriptions

File name as stored on CompuServe (CPT indicates Compact Pro archive)

[73060, 3552]
ATAXX.CPT/Bin

Size of file (in bytes)

Bytes: 41984

Number of times this file has been downloaded

Count: 151

Date uploaded

31-Jul-92

Title : ATAXX Mac version of popular video arcade game

Keywords : GAME BOARD ATAXX

Move your globs and capture your opponents. Very well done. Shareware. One or two players.

May be dearchived with EXTRAC.BIN in LiBRary 0

Keywords assigned to the file at uploading time File description

at its name; self-extracting archives usually have the characters *sea* tacked onto their names. Decompressing a self-extracting archive is easy: double-click on its icon and then specify where you want the decompressed file or files to be stored.

If the file's name ends with other characters, it probably isn't a self-extracting archive, and you'll need a copy of the compression utility to open and decompress the archive. Archives whose names end in *SIT* were created using StuffIt—most files available online are either self-extracting archives or StuffIt archives. You can decompress StuffIt files using the shareware StuffIt Lite, which is available online as a self-extracting archive. Or you can download UnStuffIt, a free, stripped-down StuffIt that can decompress files but not compress them. A free, decompress-only version of Compact Pro is also available online.

America Online 2.0 also streamlines the decompression process by automatically decompressing StuffIt-format archives as soon as you sign off.

Other Downloading Opportunities

I'VE CONCENTRATED ON FREWARE and shareware forums here, but there are other online sources for software, too. Many developers have customer-support forums on CompuServe and America Online, and have their own software libraries that contain demo versions of their programs, sample documents, answers to commonly asked questions, and more. Hardware vendors often post the latest versions of the system extensions their products require. The extensions are free except for the connect-time charges.

Then there are *bulletin boards*, small-scale online services often run by user groups or avid hobbyists. A free HyperCard stack by Jay Rose called National BBS List (available online) contains a list of over 1000 bulletin board systems. A list of bulletin boards also accompanies White Knight.

The technicalities behind downloading can seem complicated at first, especially if you use text-oriented services like CompuServe. Just remember the following steps: make sure your communications settings and transfer protocols match those of the service you're using, decompress your files after downloading them, and pay for the shareware you use—even if you aren't a Grateful Dead fan. **m**

See *Where to Buy* for contact information.

Contributing editor JIM HEID looks at a different aspect of Mac fundamentals each month. His latest book, coauthored with Peter Norton, is a second edition of *Inside the Apple Macintosh* (Brady, 1992).

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Insights

HOW TO LOTUS 1-2-3 FOR MACINTOSH

BY PHILIP STEIN

It's As Easy As . . .

Today's Lotus 1-2-3 for Macintosh is nearly as different from the original product as the first 1-2-3 was different from ledger and pencil. It's a versatile presentation tool, problem solver, and yes, it's even a programming language. Here are some tips to help you get the most out of this sophisticated and powerful product, with thanks to Yuko Takagi and Chris Reckling of Lotus for their help (Lotus is at 617/577-8500).

According to Form

Lotus provides data entry forms for spreadsheets that have been organized as data-

bases. Highlight the data, along with column headings, and choose New Form from the Data menu. The resulting entry form is, in fact, automatically saved as another sheet in the same file, and the first few lines are reformatted to look like an entry form.

The entry form screen can be used to browse or search the data, enter new records, and modify existing ones. Sometimes you want computed records to appear right on a form; in a personnel database, for example, you could calculate a new field for years of service from a hire-date entry in an existing field.

To make a computed field,

though, you can't refer to the data in the entry form. The actual data for a record selected on the entry form resides on the data sheet. Put the formula in the display area of the entry form, but get the data from the data sheet. For the years-of-service example, if the hire date is in cell J515, replace the years-of-service cell in the display area with `@INT((@TODAY-J515)/365.224)`.

But Does It Fit?

When your spreadsheet is too large to fit on the screen, first try changing the font, size, or style to something smaller. Do

this by selecting Global Settings from the Worksheet menu and making changes in the dialog box that pops up, rather than selecting all cells and using Font from the Style menu—the latter method results in enormous data files. Try using the Helvetica Narrow font for a real squeeze. If your data still doesn't fit on screen, you can scroll to see what you're working on, but doing so will probably hide the row and column headings. To remedy this, split the window by dragging the split-screen icon, or use the Split command from the Window menu. When you have made both horizontal and vertical splits, dragging the icon where the scroll bars meet in the center changes the size of all four panes at once. The panes scroll together unless you uncheck the synchronize scroll box, accessible from the Window menu's Split command. If you get lost, check this box again and the windows will re-synchronize.

If you need even more room on your screen, move or close the draw and style palettes and the status window. Also, double-clicking on the shaded bar at the left edge of the "console" shrinks that bar. When you save your work, the positions of the floating toolboxes are saved as well. To restore them to their original locations, hold down both the ⌘ and option keys when launch-

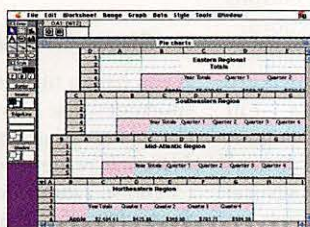
continues

Getting Some Perspective

In Lotus 1-2-3 you can save up to 256 spreadsheets as part of the same data file. This means you can make a true 3-D spreadsheet. For example, one spreadsheet could show regional sales results, by calendar quarter, by product line, with a yearly summary. A second, similar spreadsheet could display mid-Atlantic results, and so forth. A summary spreadsheet could add up the regions and display national totals. As many as 9 spreadsheets of the 256 can be arrayed on screen in perspective (see "Pie Chart Pile"). To layer a group of spreadsheets, choose Split from the Windows menu and click on the Perspective radio button, then click on OK. Data entry forms and macro

sheets are also kept as pages in the group of spreadsheets. A navigator pop-up menu appears at the upper-left corner of the active spreadsheet, allowing you to choose a sheet on which to work. The selected spreadsheet is highlighted with a dark border.

You can hide columns from view, and the same can be done for whole spreadsheets. Choose Hide | Show from the Worksheet menu and click on the Sheet radio button. A hidden spreadsheet disappears from the navigator pop-up menu—you can tell when a sheet has been hidden by the absence of an entry, since spreadsheets are always labeled A, B, C, and so on, and listed alphabetically under the pop-up menu.



Pie Chart Pile Up to nine sheets may be stacked in a window, making visualization of three-dimensional data especially easy.

ing 1-2-3 from the Finder. If you closed them, choose Floaters from the Windows menu, and you'll be given an opportunity to retrieve them. The status bar at the bottom of the screen might seem less useful than some of the other floaters, but when there's a circular reference in a set of formulas, a button named Circ appears there and you can find the location of the problem by clicking on the button. If you have limited screen real estate, dialog boxes—for example the Move Cells box—will sometimes cover up what you're looking for. Double-click on the title bar of a dialog box and it will roll up like a window shade, leaving only the title bar of the box on screen. Double-click on the bar again to restore the full dialog box.

Dolling It Up

A table of numbers is sometimes the right way to display data, but often a graph not only enlivens a presentation, but enhances communication and understanding as well. Lotus 1-2-3 can automatically generate a wide range of typical two- and three-dimensional graphs. Just highlight the data to be plotted, along with labels if they're on the sheet; from the Graph menu choose New Graph, then select the type of display you want from the pop-up palette, and stand back (see "Pie Charts"). You can also tear off the graph palette.

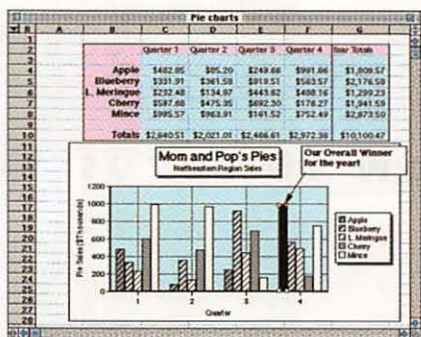
After a graph is plotted, you can move it, resize it, and change virtually every label or color. When the data changes, the bars or segments adjust accordingly but retain your cosmetic settings. Use the draw tools to add text boxes, arrows, and other display elements.

You can change the graph type without selecting the data again. When a graph is selected, the New Graph menu item is replaced by Change Type. Simply select another type. Try a few to see which communicates your data best. If the graph palette is already torn off, just click on the new

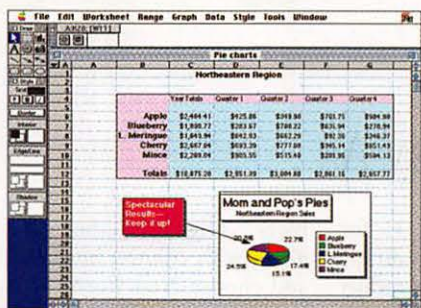
type desired. When the graph looks right, click on various elements and adjust the color or shading. The legend box automatically reflects your changes. When you select a category within a graph (for example, Apple Pie), all bars of that particular type are highlighted, and changing one bar changes them all. By option-clicking on a bar, it alone is selected and can be emphasized as you wish (see "Our Overall Winner").

From a Strange Land

If you have moved to Lotus 1-2-3 for Macintosh from Microsoft Excel for the Macintosh or 1-2-3 for DOS or Windows, the transition should be quite easy. Here are a few ways to make it even easier. Online help is available at all times. From the keyboard, hit ⌘-? . If you want a description of a menu item, just select it while help is open—the help system turns right to the appropriate page. In a dialog box, where many programs offer no assistance at all, there's almost always a box in the upper-right corner, ready to take you back to the help files. Best of all, there's a whole set of item-by-item menu translators for Excel and DOS 1-2-3 users. Click on the Excel/123 button at the bottom of the help screen and you get a full list of Excel commands and their 1-2-3 equivalents. If you're used to 1-2-3 Release 2 or 3 for DOS and you just can't get the hang of the Mac, don't despair. Just pretend you're using a DOS computer. Yes, the screen is white and the letters are black, but you can make almost everything else look the same. Hitting the slash (/) key brings up the 1-2-3 Classic menu. From here on out, everything looks and works just like the DOS version—right down to the type style in the menus and the prompts on the second line of text. If you're tired of the nostalgia, just click on the close box or keep hitting the esc key until the classic display goes away.



Our Overall Winner
Option-click on a bar to select it individually—without including others in its category. Then change color or shading to highlight it.



Pie Charts This graph was plotted automatically from the data above it, including the legends and coloring. You can easily add text boxes and arrows like the ones shown.

Excel users will find many functions and facilities very familiar and will be able to get right to work. They will also like the function and range pop-ups on the console. But one useful capability that is missing from 1-2-3 is Excel's Fill Right and Fill Down commands. Luckily, Lotus provides macros for these functions, and they can easily be added to a menu and assigned keyboard shortcuts. Choose Open from the File menu and locate the Worksheet Templates folder in the Lotus 1-2-3 directory. In that folder is an item named Fill Right, Down, Through. Opening this file automatically adds those macros to the Tools menu and, on an extended keyboard, allows you to use control-option-R, -D, or -T as shortcuts. As with any 1-2-3 macro, you may use the draw palette to create on-screen push buttons that activate these functions.

Just one second, though—Fill Right and Fill Down are familiar, but what's Fill Through? That's an analogous operation for the third dimension. When you have several stacked sheets, you click on the first cell in a range (for example, A:D3) and then find the last sheet of interest and shift-click on the last cell (for example, E:D3). The Fill

Through operator copies the contents of A:D3 into cell D3 of sheets B, C, D, and E.

To transfer work from Excel, simply open the Excel file from within 1-2-3. Almost all worksheets and graphs translate perfectly, as do most macros. Don't save Excel sheets in .WK1 or .WK3 format to move them to 1-2-3 for Macintosh, though—any dates will be four years off, because Excel and 1-2-3 handle them differently. The 1-2-3 translator fixes the problem when reading Excel files. There are also differences in the way the two products handle the INT, MOD, and AVG functions; and some operator precedence assumptions may be different. If you've used any sophisticated formulas or functions, it's best to do a little checking before using an imported spreadsheet.

Share the Wealth

If you have a tip, technique, or shortcut that wasn't mentioned here, share it with other *Macworld* readers by sending it to *Quick Tips*, *Macworld*, 501 Second St., San Francisco, CA 94107. **m**

PHILIP STEIN consults and lectures widely on measurement science, statistics, quality, and automation.

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EDITED BY SUZANNE COURTEAU

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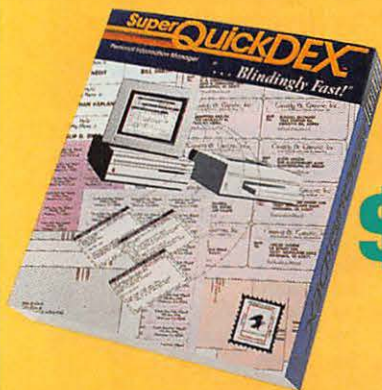
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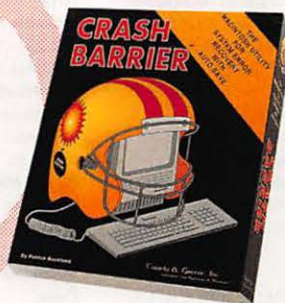
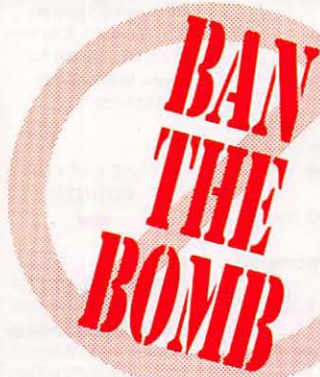
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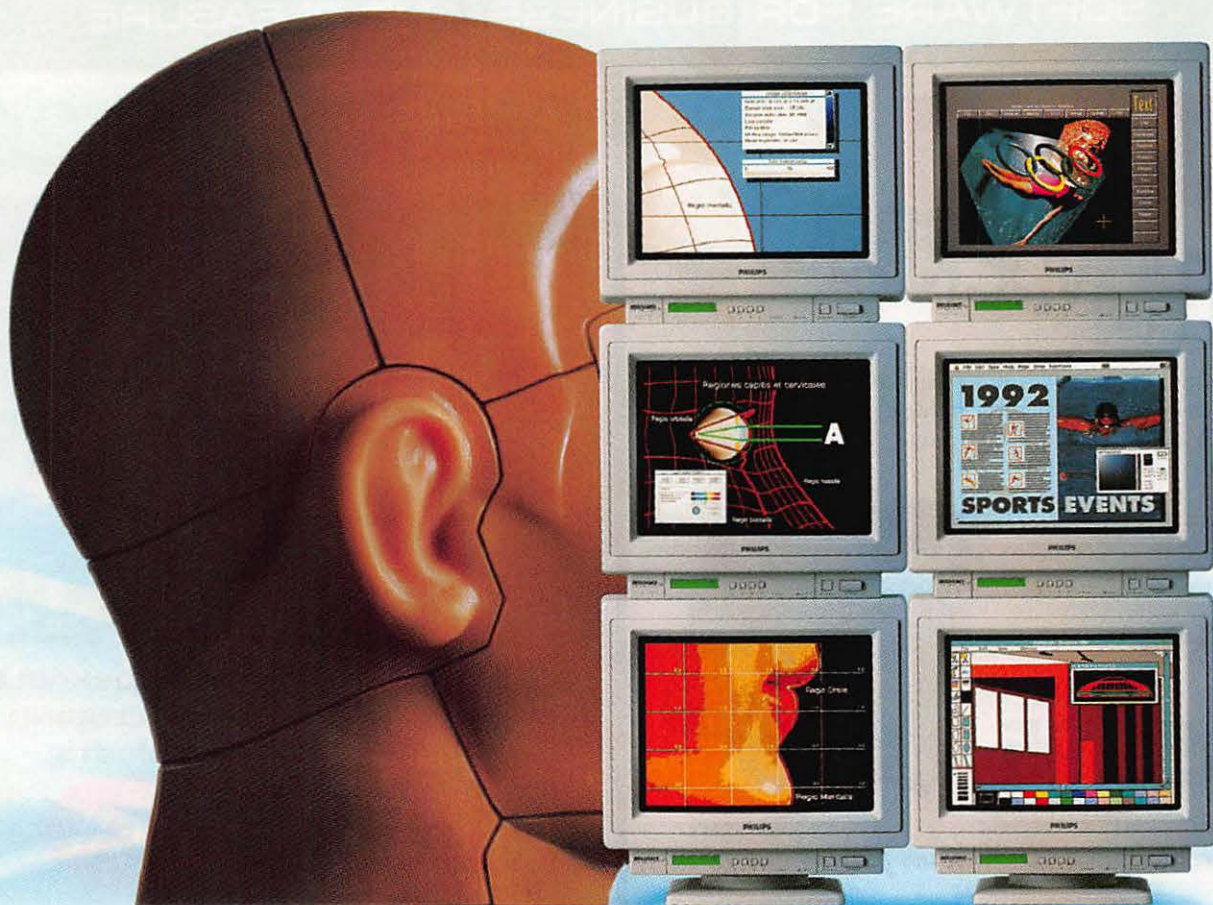
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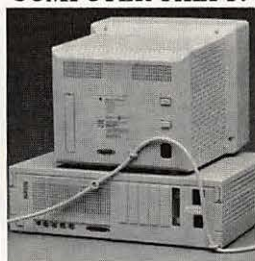
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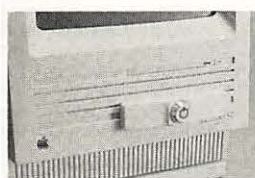
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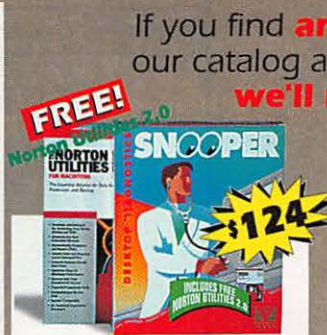
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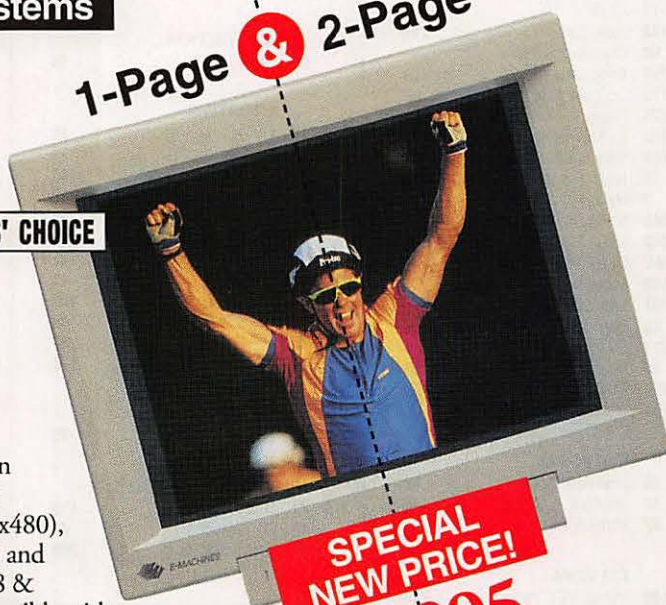
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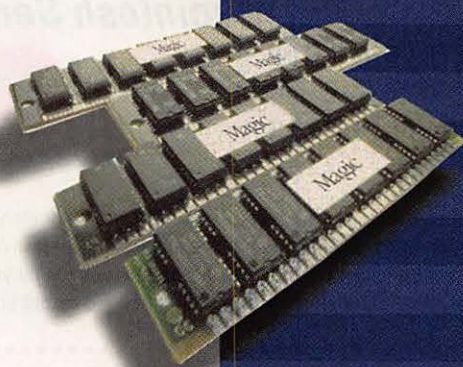
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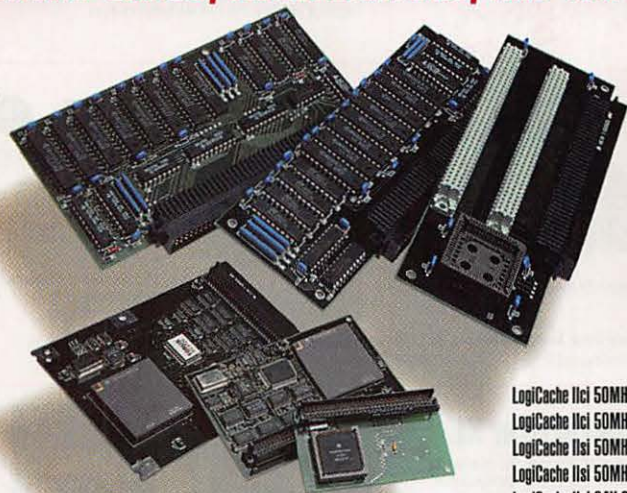
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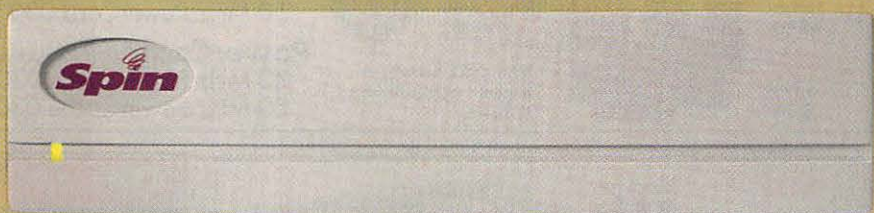


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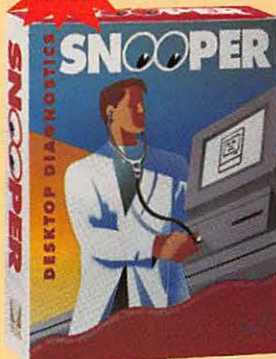
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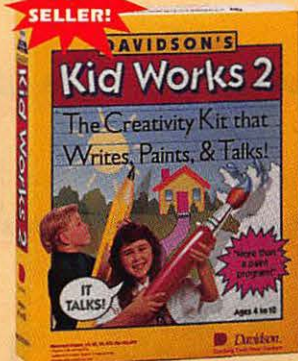
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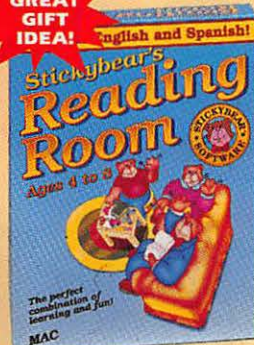
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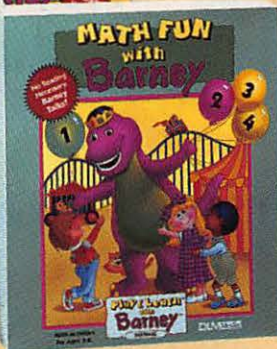
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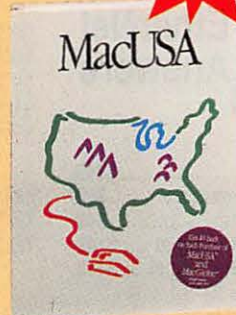
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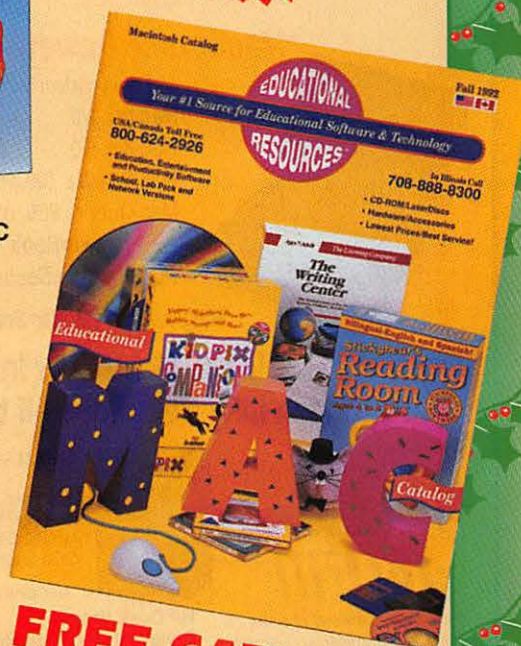
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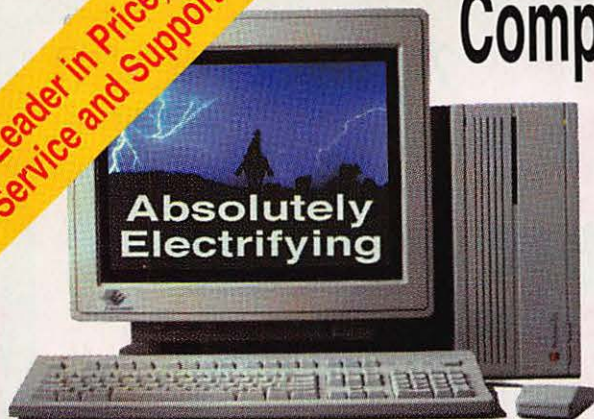
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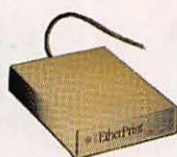
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QuickTime Starter Kit

Includes everything you need to get started with QuickTime – the QuickTime INIT, Movie Player, Movie Converter, PICT Compressor, and a CD-ROM full of QuickTime movies you can integrate into your work. Also comes with a full manual on using QuickTime.

Apple Corporation

4608 QuickTime Starter Kit\$158.

At Ease

New! Put your mind at ease. You choose which applications you'll allow others to access and put them on the At Ease desktop. The rest of your hard disk is protected by a password. Great for homes with computers and children.

Apple Corporation

5247 At Ease\$49.

Macintosh PC Exchange

Display DOS disks on your desktop just like Mac disks. Subdirectories on the disk appear as folders and data files as documents. Format 3.5" low density disks in 720K DOS format, and 3.5" high density disks in 1.44MB DOS format. You can open, change, and save documents just like they were Mac files.

Apple Corporation

4609 PC Exchange\$69.

System 7.1

New! Check out the new features. A new Fonts folder will resolve font ID conflicts automatically. Complex character sets such as Japanese are now supported by World Script. Also includes all the fixes now in the System 7 Tune-Up extensions.

Apple Corporation

5255 System 7.1 Personal Upgrade\$98.

5254 Group Upgrade\$278.

WriteNow Workshop Bundle

A collection of 4 award-winning packages designed to improve your writing. Includes WriteNow 3.0, the fastest & easiest Macintosh word processor. WriteNow's size and speed make it the best choice for the Classic, LC, and PowerBook. Bundle includes American Heritage Dictionary, Correct Quotes, and Grammatik Mac for FREE! (\$500 Value)

T-Maker

5308 WriteNow Workshop Bundle.....\$139.

5309 Competitive Upgrade – WriteNow WorkshopBundle.....\$69.

KidDesk

KidDesk was designed by early childhood experts to give kids creative control over their computing environment – without putting yours at risk. Parents select which programs appear on KidDesk from those installed on the hard drive. Then even young children can launch their own software programs and learn by playing with the KidDesk accessories.

Edmark

5182 KidDesk\$35.

Shortlist

Combines the features of multiple productivity tools into one remarkably easy-to-use program! Time-management, phone dialing, mail-merging, and much more. Your data becomes more useful and accessible. Power-saving features allow 50% longer battery life – perfect for PowerBooks!

Brainchild Corporation

4901 Shortlist\$98.

IntelliDraw

IntelliDraw is an extraordinary new drawing program with intelligent features that give you an easy new way to visually experiment, refine, and draw your ideas. Visual "what-if" – innovative smart tools link graphics in your drawing so they respond to changes automatically.

Aldus Corporation

4771 IntelliDraw\$198.

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WorldLink

Dial up the Internet from your Mac without a dedicated line! You don't need Unix with WorldLink. You'll have access to over 13 million people and five different e-mail services – AppleLink, Compuserve, America On Line, The Well, and all the resources Internet has to offer.

InterCon

5195 WorldLink\$26.

NetVANTAGE II

Plan your network right. NetVANTAGE II is the only software available that allows you to evaluate proposed network configurations by building an on-screen "virtual network" and then "running" that network. You'll see user-perceived performance times, network bottlenecks, underutilized resources, and serious configuration errors before they happen.

Eclectic Software

5164 NetVANTAGE II\$798.

MagicNet 4 Port Thin Ethernet Repeater

Hub your Macs on Thin Ethernet for half the cost of other repeaters. You'll save time when it comes to trouble shooting because each port has a signal light to show you where the problem lies. No more checking each connection on your backboned network.

Tutankhamon Electronics

5240 MagicNet 4 PORT Thin Ethernet Repeater\$448.

COPYright

COPYright is a transparent utility that completely replaces the Finder's copy functions. Copy files and folders in the background while still performing all Finder functions including launching applications and deleting files. COPYright also permits you to simultaneously copy multiple files to multiple destinations.

CSG Technologies

5147 COPYright\$29.

5253 COPYright Pro\$49.

Universal PowerCache

When you feel the need for speed, the award-winning PowerCache gives you the best combination of blazing-fast speeds (up to three times faster) and cost-effective prices. More important, it's guaranteed 100% compatible with all your software and hardware while running at full speed.

Daystar

Universal PowerCacheSee Listings under Hardware

MACCON3

Get a 16K RAM Ethernet card for your Mac IIx with all three types of Ethernet – thick, thin, and 10BASE-T. Includes an FPU socket for an optional math co-processor and a PDS pass-through port for additional PDS cards. Five year warranty.

Asanté

3703 MACCON3\$248.

TurboPS/400P

The TurboPS/400P produces brilliant 400 by 400 dpi – almost twice the resolution of standard 300 dpi laser printers. Add to that Image Enhancement Technology to smooth characters, sharpen curves and angles, and eliminate jagged lines. It's ideal for the desktop publisher or business graphics user.

NewGen Systems

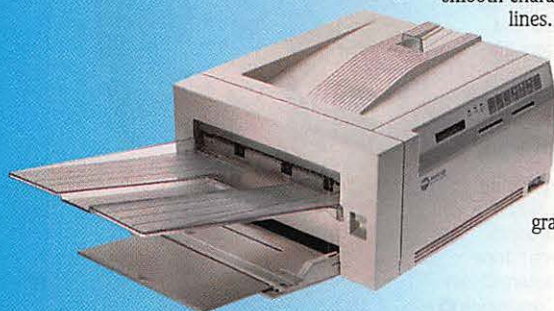
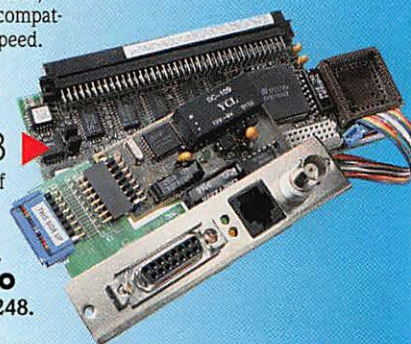
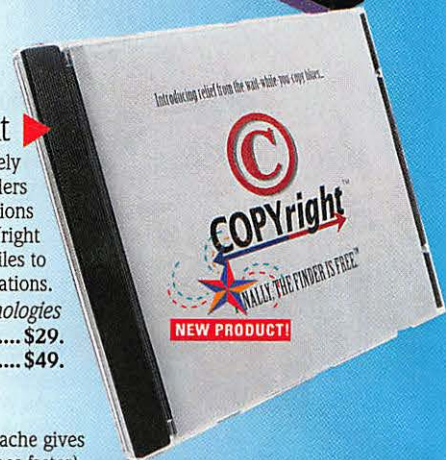
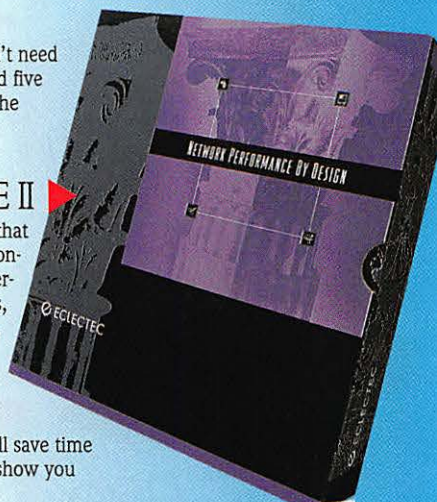
5259 TurboPS/400P\$1898.

Dual Page Mono Display

Perfect for multitasking or any job that's easier with more screen space – spreadsheets, desktop publishing, text, and graphics. This 19" two-page display provides 1024 x 828 screen resolution at 74 dpi, a 75 Hz refresh rate, and "Apple-standard" P104 phosphor.

Lapis Technology

4700 Dual Page Mono Display\$698.



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DateBook combines calendar, scheduling, alarms, and to-do lists to keep track of all your daily activities. TouchBASE keeps all of your personal contacts at your fingertips. They work separately or together to help you manage your time and your contacts.

After Hours

5002 DateBook & TouchBASE Bundle\$98.

PowerMerge ▶

Finally, a simple and automatic way to keep track of the latest version of your files when you use a PowerBook and a desktop Mac! Select an unlimited number of files, folders, or disks to be maintained and synchronized. Conflict notification if changes have been made to files on both Macs since updating.

Leader Technologies ●

5010 PowerMerge\$79.

◀ Disk Café

If you use drives from different manufacturers, you need to format them all with the same utility. Disk Café is a complete storage formatting utility that works with nearly every drive available. So it can prevent compatibility problems including data loss. And its advanced diagnostic tools detect and repair disk defects.

Bering Industries

5121 Disk Café\$45.

PowerBook Memory ▶

Your actual memory requirements can easily be twice what the PowerBook provides. Newer Technology specializes in low power consumption PowerBook memory with a full line of RAM upgrade cards (even for the new PowerBooks) that are easy to install. Call for pricing on the complete line of Newer PowerBook memory for old and new PowerBooks.

5310 PowerBook 140/170 Psuedo-Static 6MB\$318

5311 PowerBook 160/180 DRAM 6MB\$428

◀ Berlitz Interpreter

Based on the popular dictionaries, the Berlitz Interpreter provides quick and accurate translations for anyone who encounters foreign words in correspondence, literature, or language studies. This word-for-word translation program allows you to instantly translate individual words between five major languages simultaneously: English, Spanish, French, German, and Italian.

Microlytics

5231 Berlitz Interpreter\$35.

Stuffit Space Saver/Stuffit Deluxe 3.0 ▶

Stuffit SpaceSaver provides complete on-the-fly compression. Increases disk space (with lightning speed) without effort on your part. **Stuffit Deluxe** is the most efficient compression product available. Solves all your compression needs, from archiving to transparent compression, and includes Stuffit SpaceSaver.

Aladdin Systems ●

4971 Stuffit Deluxe\$75.

4969 Stuffit SpaceSaver\$34.

◀ QuickKeys 2.1

QuickKeys is the ultimate desktop automation tool, designed to improve your desktop environment. It's easy for you to create and use hundreds of time-saving shortcuts. Any repetitive task you perform on your Mac can be done more easily and more consistently with QuickKeys.

CE Software ●

3388 QuickKeys 2.1\$89.

AccessPC 2.0 ▶

Just pop any DOS 3.5" disk in your drive and in a couple of clicks, you see Mac files. Edit, copy, save, and print in Mac applications and then return the file back to a PC.

Insignia Solutions

4693 AccessPC 2.0\$59.

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◀ Songworks

Compose music the easy way. Songworks not only prints your songs, it helps you to compose them. Play a tune on the computer keys or a MIDI keyboard, and watch Songworks handle the notation. It can suggest chords, generate tune ideas, and transpose, play, and print your song with melody, chords, symbols, and lyrics.

Ars Nova ◊

7 5153 Songworks\$68.

Virex 4.0/single user & 10 pak

Virex detects and repairs files infected by all known Mac viruses. Then it prevents infection by continuously monitoring files and performing instantaneous repairs. It also keeps your network virus free with scheduled virus scans. Virex is updated frequently to combat new viruses, and all registered users receive one free update.

Microcom ◊

5234 Virex 4.0/single user.....\$72.

5235 Virex 4.0 10 Pak\$498

◀ The Miracle Piano Teaching System

The first keyboard that teaches you how to play it! Makes learning even the basics a pleasure. Professional keyboard with 49 standard-sized velocity-sensitive keys, 128 digitized instruments and sounds, with full MIDI compatibility. Includes hundreds of songs and lessons, and full orchestral accompaniment.

The Software Toolworks

4072 The Miracle Piano Teaching System.....Call.

Act! for the Mac

This unique, integrated contact and calendar management solution handles your hectic schedule - automatically. Schedules calls, meetings, and to-do's. Generates a variety of written correspondence. Automatically and intuitively remembers every detail about each contact and activity past, present, and future. Also available for Windows!

Contact Software ◊

4970 Act! for the Mac\$244.

5273 Act! for Windows.....\$258.

◀ Series 1 Photography Filters

Series 1 Photography Filters are software filters for Photoshop that emulate 35mm camera optical filters. Now you can generate optical effects other than the painterly effects now available. These filters are perfect for both the graphic artist and the photographer creating ads, brochures, advertising, and video presentations.

Andromeda Software

5161 Series 1 Photography Filters\$81.

macINTERCOMM

The first and only telecommunications program with true multitasking that offers completely invisible file transfers. With a scripting language of unprecedented power, full protocols, and terminal emulation, you'll agree that macINTERCOMM defines the new standard in telecommunications. Includes a SmartDial feature for traveling users and many more features.

Mercury Systems Inc. ◊

5111 macINTERCOMM\$124.

◀ Algebra I Homework Tutor

"The best algebra tutorial program I have ever seen." (Macworld, 4-91) This program can generate problems or take problems from a student's own text book. Students are checked on every step toward the solution and can request a series of increasingly more specific hints when they have trouble.

Missing Link ◊

5150 Algebra I Homework Tutor\$49.

Quicktel V.32bis FAXModem

The Quicktel 14,400 bps send/receive fax with 14,400 bps data modem combines speed with the quality and styling that wins raves. It includes CCITT V.32bis, V.42bis, and MNP 5. Speed through large files at rates from 14,400 to 57,600 bps when connected to a compatible modem. Lifetime warranty.

Logicode

4176 Quicktel V.32bisFAX/Modem\$328.

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Experience a universe of adventure and conquest. Rule an expanding empire while pursuing diplomatic relations with other emperors in neighboring star systems. Race for technological advancement and planetary discovery. Go where no Mac has gone before!

Changeling Software

4992 Pax Imperia \$34.

Capitalist Pig

New! Thought-provoking business simulation that lets you start and run a business in the privacy and safety of your own computer. Choose your company name, stock logo, product, and source of capital. Then set your business, financial, and marketing plans – the clock starts ticking, and you're in business!

Pluma

4640 Capitalist Pig \$35.

◀ MouseStick II

The new MouseStick II has optical control, five programmable buttons, and a padded handle with adjustable tension for unbeatable control. Works with all Mac games, even those with only keyboard control. Includes custom settings for most popular games.

Advanced Gravis ●

5079 MouseStick II \$58.

◀ Aesopolis

Bring Aesop's fables to life with multimedia. This enchanting CD-ROM features a stunning virtual museum with thousands of splendid color canvases and high fidelity sounds. Double-clicking on one of the artworks reveals both screen-written and spoken versions of the fables.

Quantum Leap Technologies

4870 Aesopolis \$49.

◀ Hellcats

Hellcats is the most realistic flight simulator ever! In Missions At Leyte Gulf, you load your Hellcat with torpedoes, rockets, or bombs. Support a ground assault and neutralize enemy tanks and ground vehicles, or protect your fleet positions against sub attacks.

Graphic Simulations ●

4070 Hellcats Over the Pacific \$39.

4998 Missions at Leyte Gulf \$22.

Strategic Conquest & Spaceward Ho!

Spaceward Ho! 2.0 challenges you to colonize the galaxy against up to 20 computer players or human opponents on a network. Build fleets, research technologies, and conquer worlds. Strategic Conquest 3.0 is the latest version of the classic game of military strategy. Maneuver armies, planes, and boats to conquer every island and continent against the computer or a friend.

DeltaTao Software ●

2891 Strategic Conquest \$35.

4057 Spaceward Ho! \$35.

◀ Victor Vector & Yondo – The Vampire's Coffin

New! This adventure on CD-ROM integrates spectacular live action, sound, and music! Your mission is to retrieve Dracula's coffin while fending off evil beings. Truly interact with the play environment and use your creativity, skill, and intelligence to overcome obstacles.

Graphic Simulations ●

Victor Vector & Yondo

5168 The Vampire's Coffin \$40.

Big Business/Hole-in-One Miniature Golf

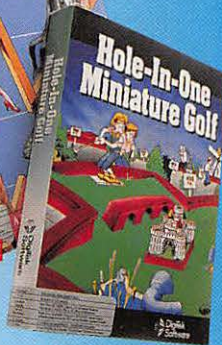
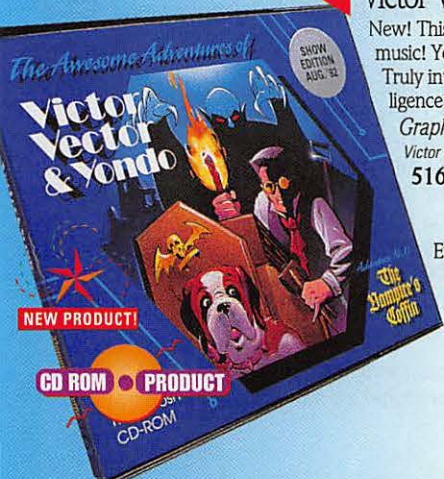
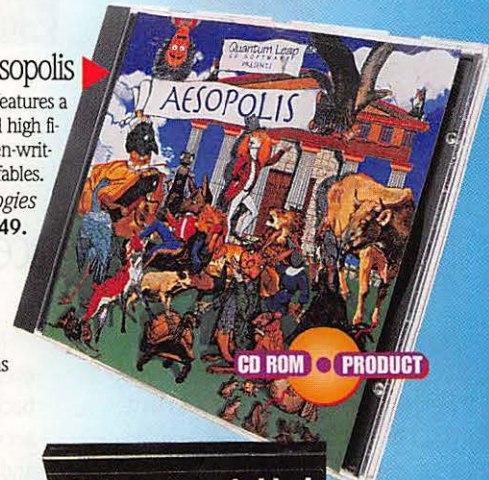
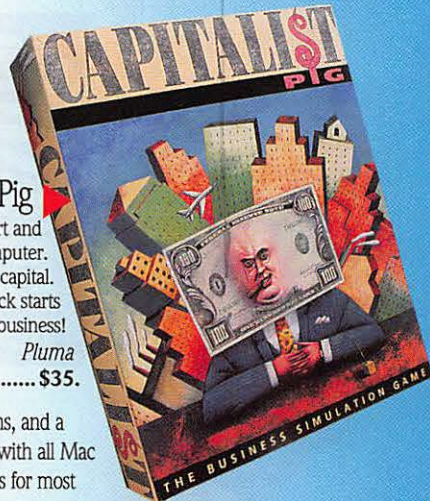
Ever wondered what running a big corporation is like? **Big Business** is a not-so-serious simulation where you initiate takeovers, start law suits, and more. **Hole-In-One Miniature Golf** combines superior sound, graphics, and playability with realistic ball play to give you the best miniature golf game made.

Digitek Software

5257 Big Business \$24.

4250 Hole-in-One Golf \$24.

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The longer you own your Mac, the more you'll find yourself wanting more hard drive space. Our DataPlace Hard Drives, bundled with four free utilities, offer an elegant and reliable solution. These are the most reliable drives around, preformatted using the latest technology in formatting software. And they're fast too. The two removable drives feature mechanisms from Syquest, and they come with one free Syquest cartridge. All DP+ drives feature a sturdy steel case, two metal-clad SCSI connectors, an external fuse, and an easily accessible SCSI ID switch.

Each comes with manuals, cables, a two to five-year warranty,* and instant technical support from Mac's Place. And if your drive should need warranty repair, Mac's Place will give you a free loaner. All drives come with MacTools 2.0, DP Formatter Plus, SpaceSaver, and Kaboom! SE.

Drives are pre-formatted with DP Formatter Plus so they're ready to use right out of the box.

MacTools 2.0 is all the utility you'll ever need. It performs scheduled backups and disk analysis, speeds data access by defragmenting files, detects and cleans known Mac viruses, and much more. SpaceSaver compresses your files and folders so you have double the disk space! It compresses files an average of 50% and some graphics files as much as 98%. SpaceSaver automatically decompresses files when you open them and compresses them again when you're done.

You'll find a myriad of sounds to make your Mac fun with Kaboom! SE. Each sound can be played when you start up your computer, insert disks, empty the trash, and more! Get great drives with great utilities and all the support you need from Mac's Place.

Removable Syquest Hard Drives

4197 DP+ 44MB w/Cartridge	\$508
4198 DP+ 88MB w/Cartridge	\$698
2269 44MB Cartridges	\$69
3458 88MB Cartridges	\$107

DataPlace

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5277 DP+ 42MB Quantum	\$328
5278 DP+ 85MB Quantum	\$422
5279 DP+ 127MB Quantum	\$488
5280 DP+ 170MB Quantum	\$548
5306 DP+ 240MB Quantum	\$784
4196 DP+ 425MB Quantum	\$1165
5290 DP+ 220MB Hewlett-Packard	\$942
5291 DP+ 402MB Hewlett-Packard	\$1254
5292 DP+ 1003MB Hewlett-Packard	\$2328
5293 DP+ 1025MB Hewlett-Packard	\$2108
5294 DP+ 1290MB (11.5MS) Hewlett-Packard	\$2972
5295 DP+ 1290MB (13.5MS) Hewlett-Packard	\$2488
5296 DP+ 1650MB Hewlett-Packard	\$3354
5297 DP+ 2000MB Hewlett-Packard	\$3728

Internal Hard Drives

5281 DP+ 42MB Quantum	\$238
5282 DP+ 85MB Quantum	\$332
5284 DP+ 127MB Quantum	\$398
5286 DP+ 170MB Quantum	\$458
5307 DP+ 240MB Quantum	\$694
4204 DP+ 425MB Quantum	\$1076
5298 DP+ 220MB Hewlett-Packard	\$852
5299 DP+ 402MB Hewlett-Packard	\$1164
5300 DP+ 1003MB Hewlett-Packard	\$2238

*Quantum drives come with a two-year warranty, Hewlett-Packard with a five-year warranty.

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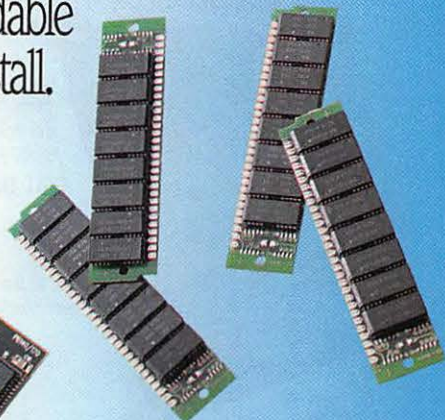
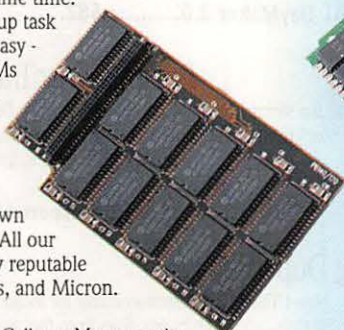
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You won't have any trouble installing a SIMM yourself, thanks to our easy-to-understand, illustrated guidebook. If you do get stuck, call our toll-free number for instant help. Every Mac's Place sales consultant has experience installing SIMMs in his or her own Mac, and will be happy to walk you through the procedure. All our SIMMs have lifetime warranties and they're manufactured by reputable companies like Toshiba, Fujitsu, Siemens, and Micron.

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SIMM/Memory

PowerBook Memory 140/170

3966 4MB Pseudo-Static\$198.

3965 6MB Pseudo-Static\$298.

PowerBook Memory 100

3963 4MB Pseudo-Static\$235.

3964 6MB Pseudo-Static\$338.

Single Inline Memory Module (SIMM)

3179 1MB 80 ns\$32.

3701 2MB 80 ns\$65.

2738 4MB 80 ns\$120.

4754 16MB 80 ns (High Profile)Call.

4755 16MB 80 ns (Low Profile)Call.

2770 FX 4MB 80 ns\$138.

2739 FX/NTX 1MB 80 ns\$42.

Video RAM for LC Quadra

4337 VRAM 256K\$37.

4338 VRAM 512K\$59.

Fast speed, low price. Great fax/modem.



State-of-the-art PC communications capability just got amazingly more affordable. On the data side, the SupraFAXModem V.32bis features 14,400 bps communications with up to 57,600 bps throughput with another modem that supports both V.32bis and V.42bis data compression. All this speed means that you'll save time on-line and money spent on connect charges and long-distance calls! And of course, the SupraFAXModem V.32bis also maintains downward compatibility with the millions of V.32, 2400, 1200 bps modems already in use. With any fax software that supports Class 1 or Class 2 fax commands, you'll be able to send and receive high-quality faxes without ever leaving your desk. And a status display with 25 different messages keeps you clearly and instantly informed about what your state-of-the-art telecomputing center is up to. SupraFAXModems are highly recommended by such authorities as *Macworld* and Berkeley Macintosh User's Group, among others.

Supra Corp.

4017 SupraFAXModem V.32bis MacPac\$348.

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- Mac's Place is open from 6 a.m. to 10 p.m. M-F Pacific Standard Time, and 6 a.m. to 6 p.m. on weekends. (For you East Coasters, this means you can call us until 1 a.m. weekdays and still receive your in-stock item that morning!)

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- All in-stock items ship same-day, (barring system failure, etc.) to your doorstep, for just \$3 (USA) via


Airborne Express overnight service. Rural locations may require an additional day for delivery. Areas not serviced by Airborne Express will be sent via Priority Mail. Our \$3 shipping charge includes insurance at no extra charge.

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- Some hardware items carry one-, two-, or five-year warranties.
- Products with the  symbol carry a manufacturer's 30- or 60-day Money Back Guarantee.

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DayMaker 2.0

New version! Daymaker 2.0 is faster and filled with new features. A Recurring Events function schedules upcoming events with more flexibility. The "To Do" view organizes "to do" items. Reports can be previewed before printing and will be sharper with integrated DYNOPAGE.

Pastel Development

5261 DayMaker 2.0.....\$82.

Bernoulli MacTransportable 90 PRO

Get all the storage reliability you'd expect from Bernoulli for 40 percent less! The new MacTransportable doesn't require an interface kit. Everything you need to get up and running is in the box including a 90MB cartridge.

IOMEGA

5012 Bernoulli MacTransportable 90 PRO\$499.

DupLocator

New! The first software available for locating duplicated files. Organizes, catalogs, and even builds disks from files scattered across multiple volumes, networks, or your entire floppy library! Features include 3D buttons, floating palettes, Balloon Help, universal file coloring, disk serialization, SCSI mounting, file compression, plus a whole lot more.

Midnight Software

4527 DupLocator\$62.

TimesTwo

TimesTwo actually makes your hard disk bigger rather than making your files smaller! A one-time installation converts your hard disk to twice its original size in minutes, leaving your data unchanged. It's completely compatible with all Mac software and works with all SCSI and erasable optical disks.

Golden Triangle

5233 TimesTwo\$99.

SNOOPER w/Norton Utilities

Find problems fast with Snooper, the revolutionary suite of hardware diagnostic and testing tools. And for a limited time, get Norton Utilities For Mac FREE. Snooper is easy-to-use, powerful, and saves you time and money. No set of Mac utilities is complete without Snooper, the hardware diagnostic.

Maxa Corp.

4260 Snooper w/Norton\$128

4261 Snooper w/NuBus card....\$168.

Simply Accounting (ACCPAC)

Simply Accounting contains everything you need to get up and running in a flash. The primer walks you through basic accounting principles, and includes a real-life tutorial with sample data. Yet it has all the practical, powerful features you need to grow a successful business. Reports, General Ledger, Accounts Receivable/Payable, Payroll, and much more.

Computer Associates

1366 Simply Accounting.....\$132.

Sketcher 1.0

Sketcher brings revolutionary natural-media and imaging technology to grayscale graphics. Create realistic natural-media effects, duplicating traditional tools and textures. Sketcher includes dozens of brushes, pens, chalks, even paper grains and image processing tools.

Fractal Design

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105mb	LPS105	3.5" Low Profile 9ms	100mb	\$319	\$329
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120mb	Go-Drive	2.5" Low Profile 9ms	120mb	\$459	\$559
127mb	ELS127	3.5" Low Profile 19ms	124mb	\$329	\$389
170mb	ELS170	3.5" Low Profile 19ms	160mb	\$385	\$445
240mb	LPS240	3.5" Low Profile 10ms	234mb	\$629	\$689
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1.2GIG	ST11200N	3.5" Half Height 10.5ms	1000mb	\$2119	\$2179
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645mb	ST4767N	5.25" Full Ht W-R II	634mb	\$1529	\$1629
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1.6GIG	ST41651N	5.25" Full Ht W-8	1350mb	\$2029	\$2129
2.1GIG	ST42100N	5.25" Full Ht W-9	1900mb	\$2949	\$3049
1.6GIG	ST41600N	5.25" Full Ht Elite-1	1307mb	\$2399	\$2499
2.4GIG	ST42400N	5.25" Full Ht Elite-2	2050mb	\$3129	\$3229
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330mb	LXT-340	3.5" Half Height 15ms	324mb	\$749	\$809
535mb	LXT-535	3.5" Low Profile 12ms	510mb	\$1099	\$1159
645mb	XT-8760S	5.25" Full Height 16.5ms	639mb	\$1239	\$1339
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CMO-3051E	Ricoh	594/652mb 5.25" Full Ht	28ms	\$2695
CMO-5030E2	Ricoh	594/652mb 5.25" Full Ht	66.7ms	\$2149
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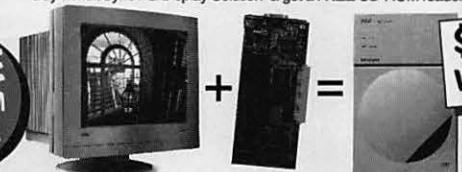


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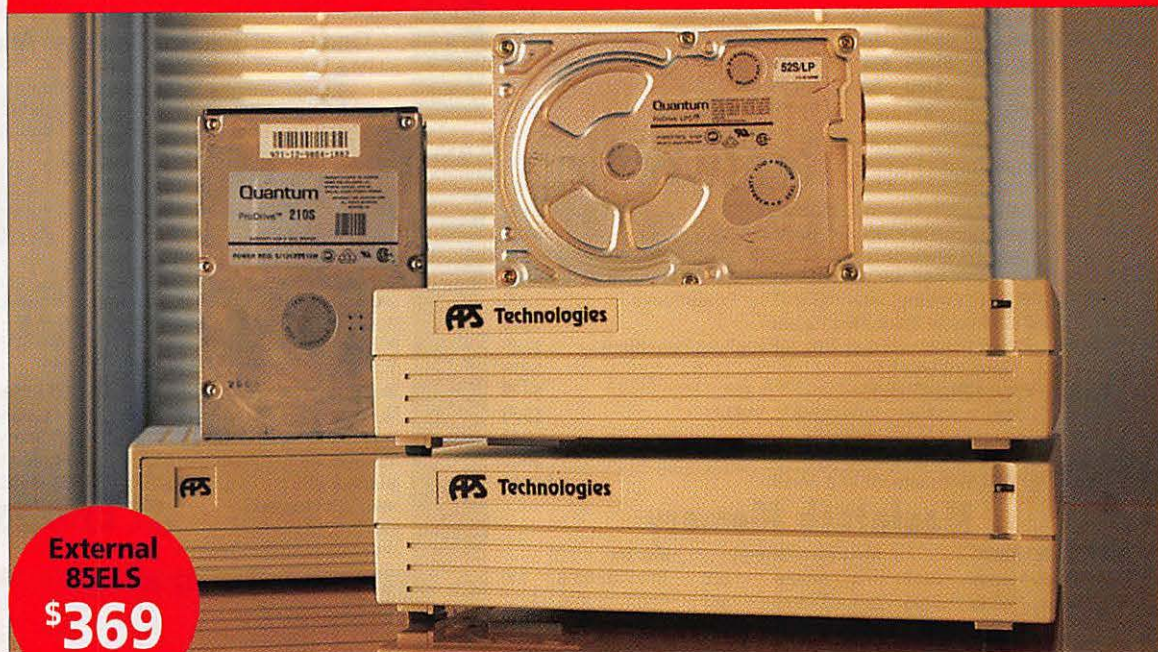
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Practical Peripherals PM14400 FXSA405
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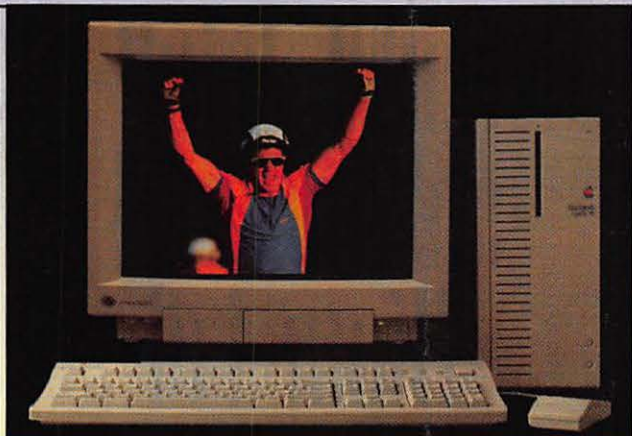
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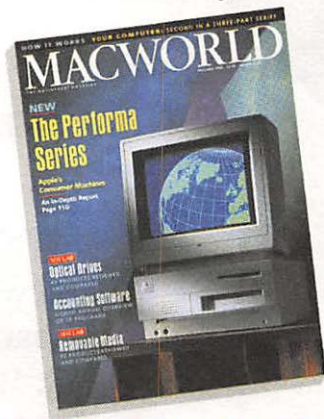
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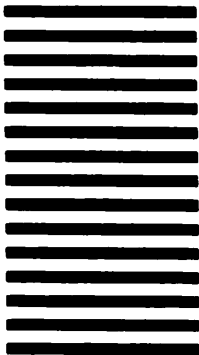
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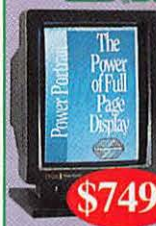
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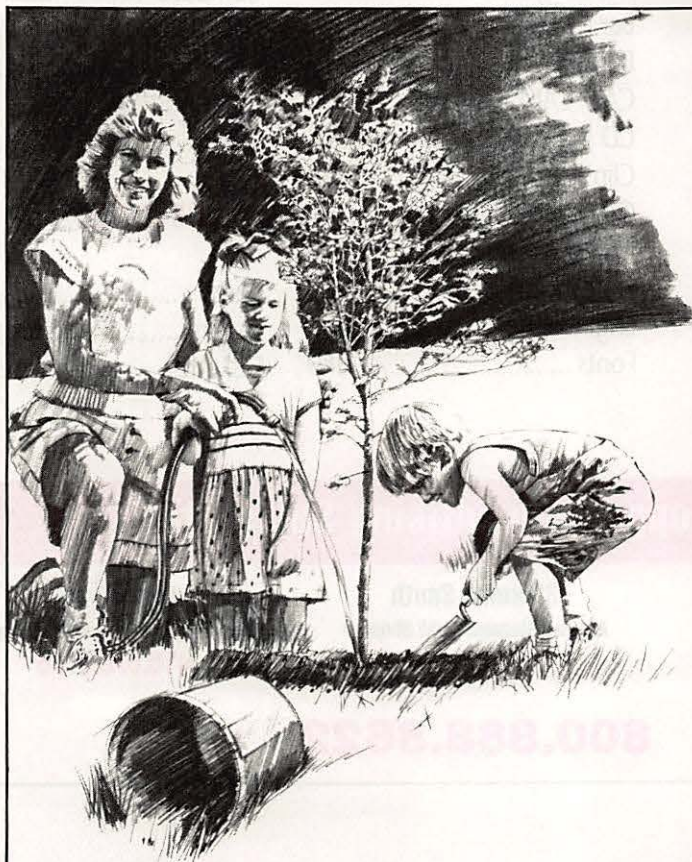
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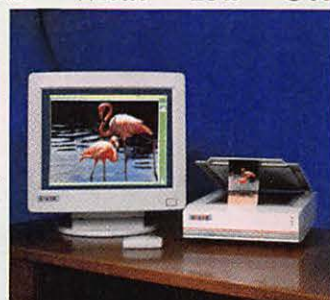
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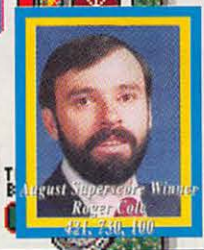
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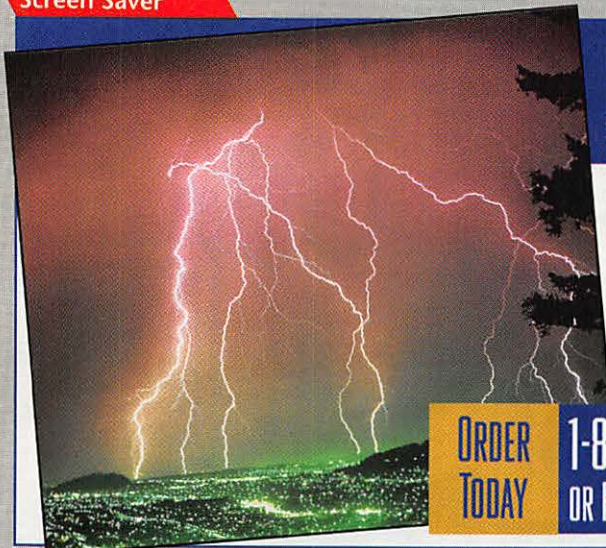
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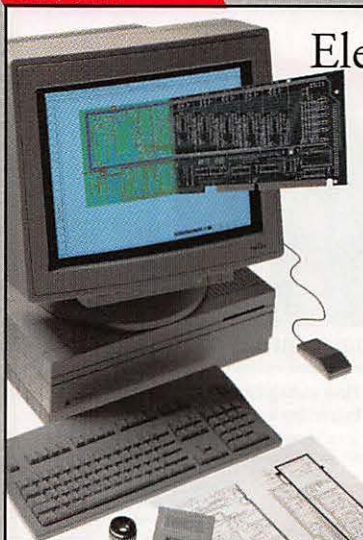
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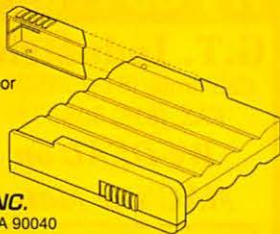
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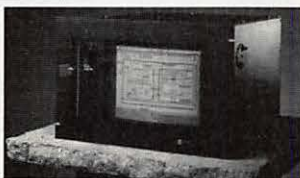
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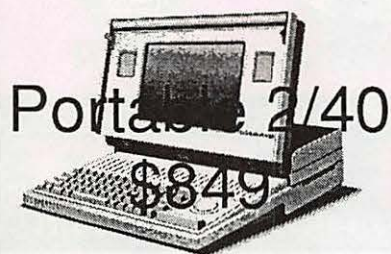
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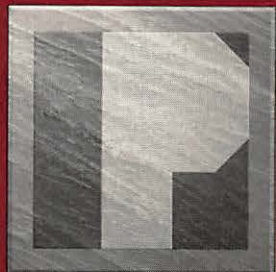


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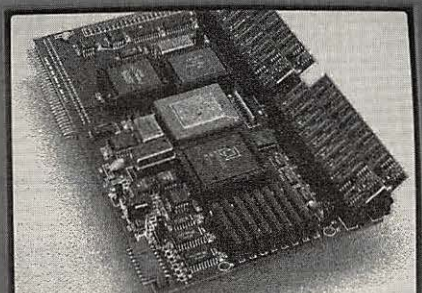
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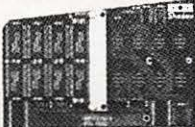
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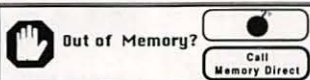
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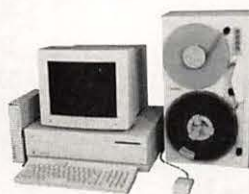
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MAC II FX	16MB	440
MAC II si	2MB	55
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POWERBOOK 140, 170	4MB	160
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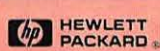
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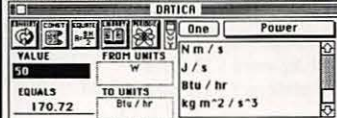
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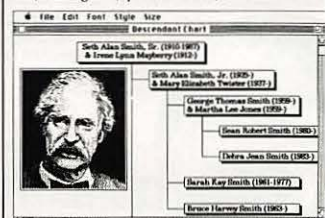
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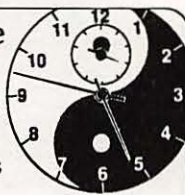
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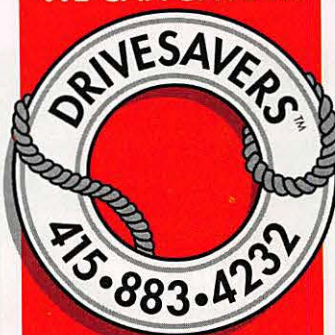
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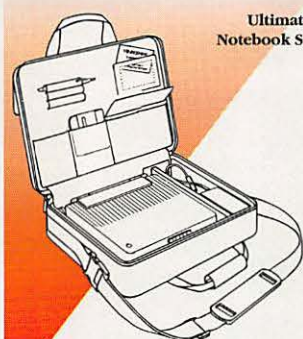
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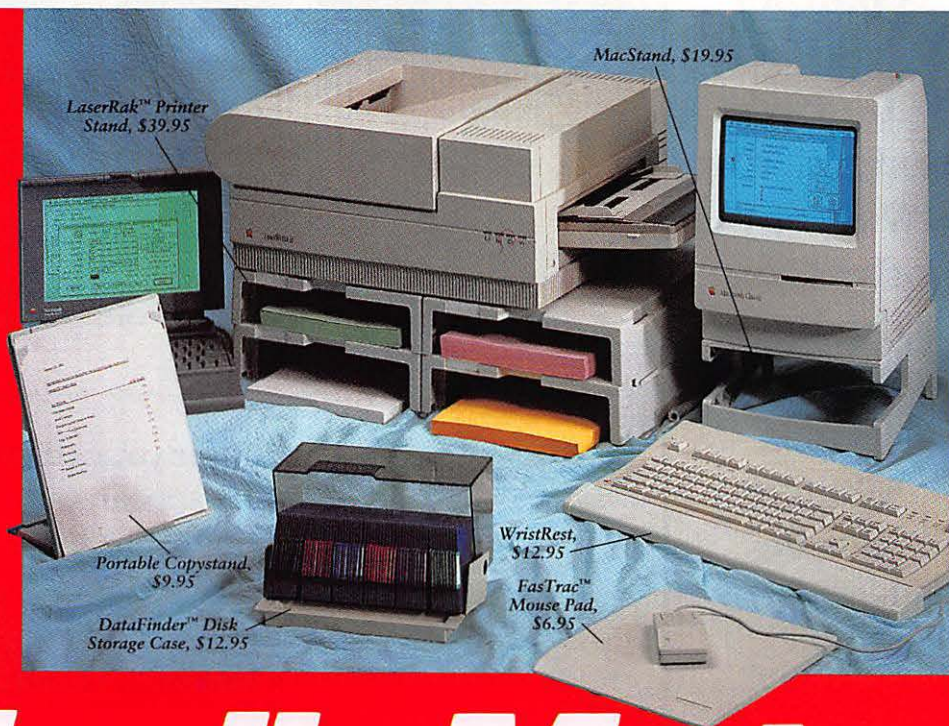
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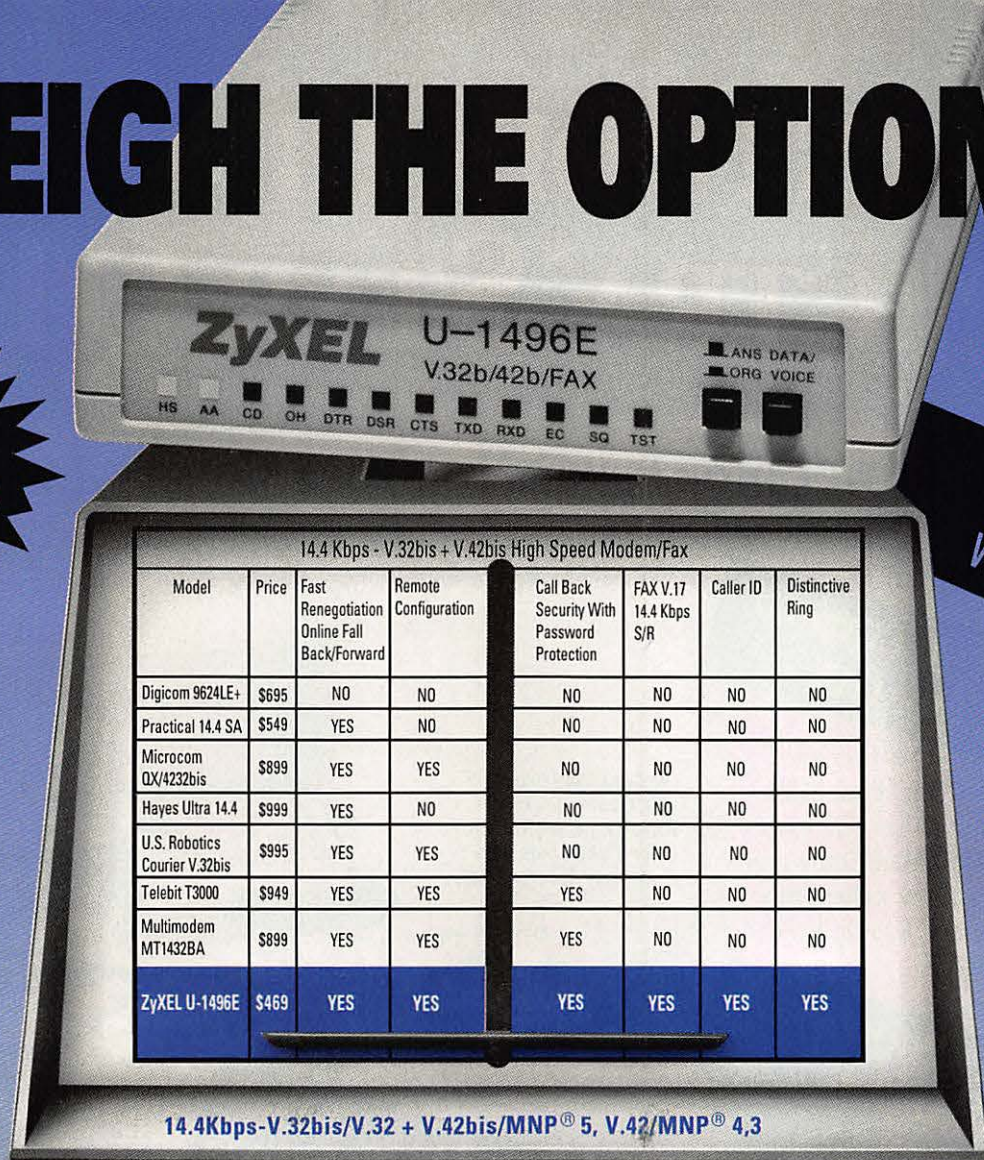
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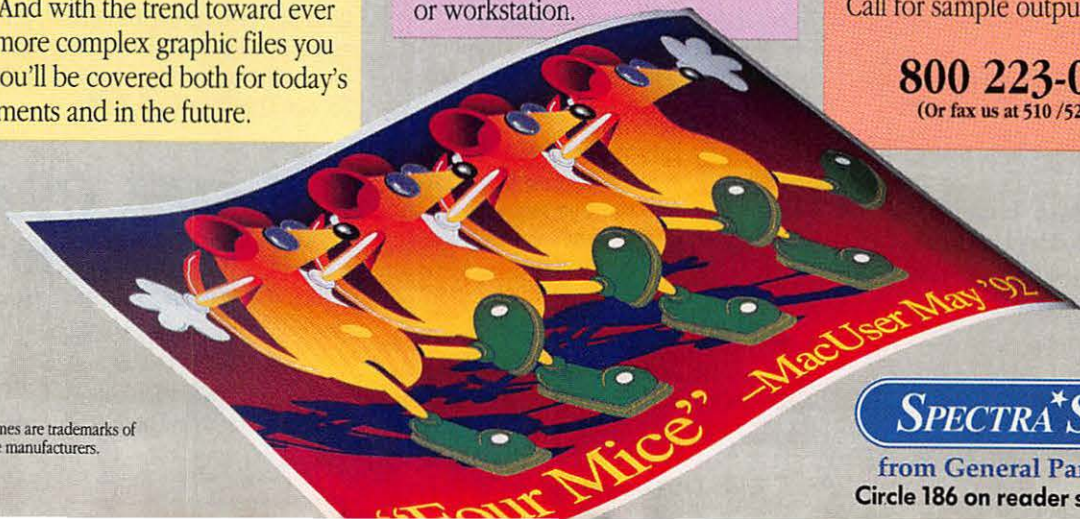
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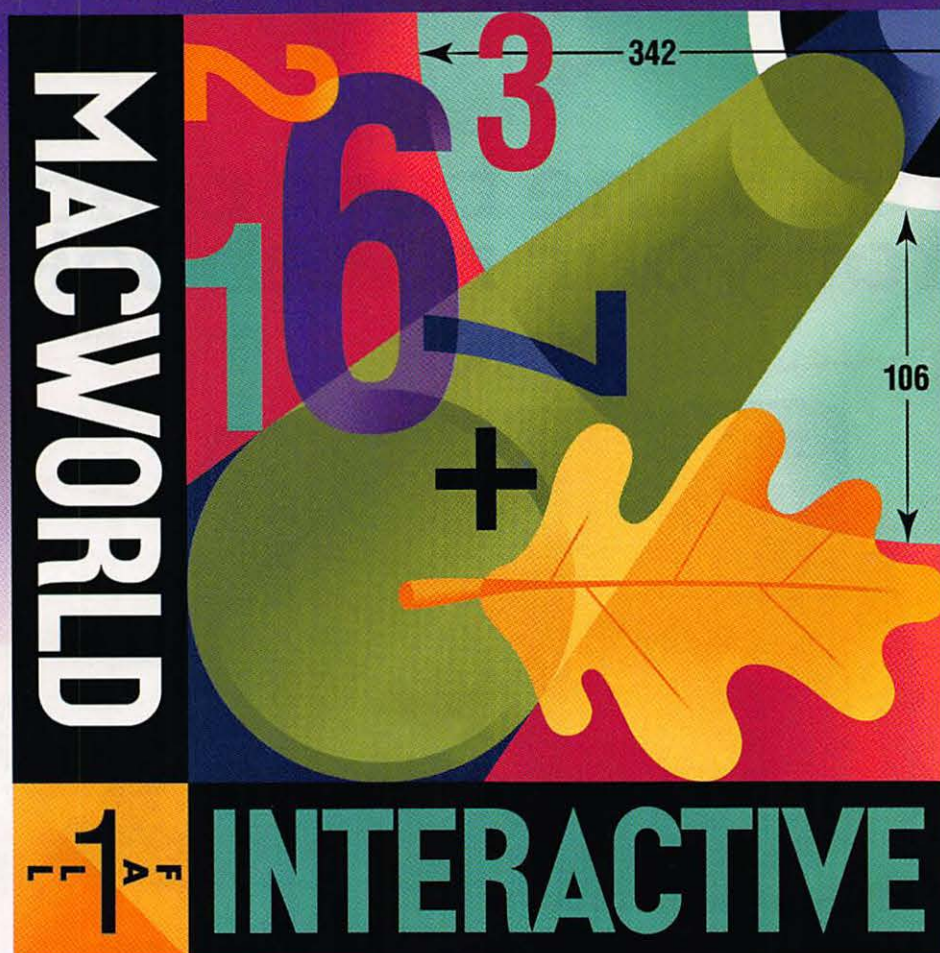
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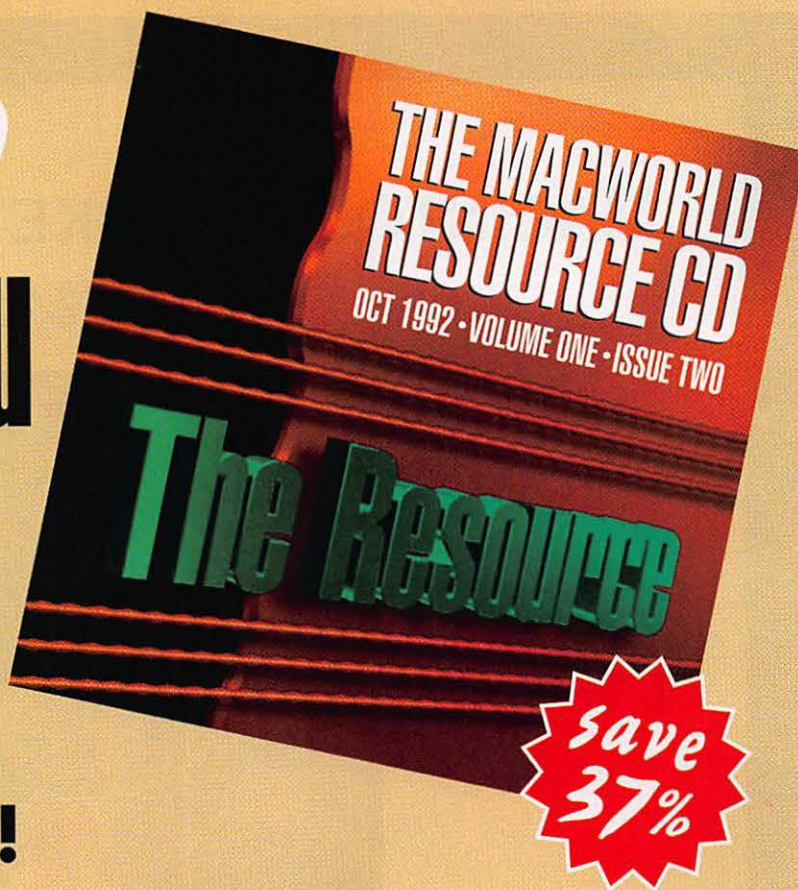
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5	6	6	ClarisWorks <i>Claris Corporation</i>
29	8	7	Quicken <i>Intuit</i>
43	7	8	WordPerfect for the Macintosh <i>WordPerfect Corporation</i>
21	11	9	MacProject <i>Claris Corporation</i>
12	10	10	Aldus Persuasion <i>Aldus Corporation</i>
66	9	11	MacDraw II <i>Claris Corporation</i>
67	13	12	MacWrite II <i>Claris Corporation</i>
6	12	13	1-2-3 for the Macintosh <i>Lotus Development</i>
78	14	14	Aldus PageMaker <i>Aldus Corporation</i>
29	—	15	Adobe Illustrator <i>Adobe Systems</i>

Education Software

44	4	1	Where in the World Is Carmen Sandiego? <i>Broderbund Software</i>
28	—	2	Where in the U.S.A. Is Carmen Sandiego? <i>Broderbund Software</i>
25	2	3	Where in Time Is Carmen Sandiego? <i>Broderbund Software</i>
3	—	4	The Playroom <i>Broderbund Software</i>
15	3	5	Math Rabbit <i>The Learning Company</i>

Months on chart
Last month
This month

Entertainment Software

56	2	1	Microsoft Flight Simulator <i>Microsoft Corporation</i>
2	—	2	Space Quest III <i>Sierra On-Line</i>
3	1	3	King's Quest IV <i>Sierra On-Line</i>
20	5	4	Crystal Quest <i>Casady & Greene</i>
31	3	5	Tetris <i>Spectrum HoloByte</i>

Network/Data Communications

37	1	1	PhoneNet <i>Farallon Computing</i>
60	3	2	AppleShare <i>Apple Computer</i>
6	2	3	AppleTalk Remote Access <i>Apple Computer</i>
15	5	4	Netware for Macintosh <i>Novell</i>
20	—	5	White Knight <i>FreeSoft Corporation</i>

Add-In Boards

20	1	1	Macintosh IIx NuBus Adapter Card <i>Apple Computer</i>
24	2	2	Macintosh Display Card 8•24 <i>Apple Computer</i>
21	3	3	Pivot <i>Radius</i>
19	—	4	Radius TPD Interface <i>Radius</i>
6	5	5	Macintosh IIx Logic Board Upgrade <i>Apple Computer</i>

Months on chart
Last month
This month

Utility Software

19	1	1	After Dark <i>Berkeley Systems</i>
9	2	2	More After Dark <i>Berkeley Systems</i>
25	3	3	Norton Utilities for Macintosh <i>Symantec</i>
30	4	4	SAM <i>Symantec Corporation</i>
20	5	5	Virex <i>Microcom</i>

The AmCoEx Index of Used Macintosh Prices

Machine/RAM/ Hard Drive	Average Sale Price	Monthly Change
Mac Plus/1MB/none	\$300	\$0
Mac Plus/2MB/20MB	\$475	+\$50
Mac SE/2MB/20MB	\$825	-\$25
Mac Portable/1MB/40MB	\$700	-\$50
Mac Classic/2MB/40MB	\$775	+\$25
Mac SE/30/2MB/40MB	\$1700	\$0
Mac LC/2MB/40MB	\$900	-\$25
Mac II/4MB/40MB	\$1650	-\$75
Mac IIsi/3MB/40MB	\$1575	-\$200
Mac IICx/4MB/80MB	\$2000	-\$400
Mac IIfx/4MB/80MB	\$2350	-\$600
Mac IIfx/4MB/80MB	\$3300	-\$500
Apple 12-inch B&W display/board	\$200	-\$25
Apple 13-inch RGB display/board	\$500	-\$75
LaserWriter Plus	\$950	\$0
LaserWriter IINT	\$1600	-\$50

Index provided by the American Computer Exchange of Atlanta, Georgia. It reflects sales during the week of September 18. Configurations include keyboard and exclude monitor and display board for noncompact models.

Source: Exclusive Audits & Surveys research from more than 250 Macintosh retailers and selected mail-order vendors. Covers sales during August 1992.

Mirror Introduces Desktop Performance For Your Powerbook...

With Mirror's exciting new peripherals, your PowerBook can function just like a desktop machine, with a high resolution monitor and plenty of storage.

The **Mirror PowerVision™**, an internal video board for the PowerBook 140, 145, or 170, works with a variety of standard monitors, including our NEW 14-inch Color Display and 15-inch Gray-scale Display. With 0, 2 or 4 MB of on-board RAM, the PowerVision's pass-thru connector lets you use existing RAM, and our installation video

makes setup a snap (professional installation also available).

The **Mirror ViewPort™** is a 15-inch monochrome display with a built-in SCSI video controller and QuickDraw acceleration for performance rivaling internal video boards. Ideal for PowerBooks, the ViewPort brings big screen power to any Mac with a SCSI port. *(continued)*

The NEW Mirror 14-inch
Color Display
\$399

Mirror PowerDock™
battery powered base
unit and charger.*
\$199

Mirror Pocket Hard Drives

80 MB **\$599**

120 MB **\$699** ◀

Includes SCSI cable for PowerBooks
and standard Macs—a \$100 value!

PowerVision internal video
adapter board includes tools and a
comprehensive installation video.

with 0MB **\$499** ◀

with 4MB **\$999** ◀

Systems including PowerVision board and display **from \$898** ◀

Mirror ViewPort™
full-page display with
built-in video controller.
Works on any Mac
with a SCSI port.
\$749 ◀

heralds For The Desktop.

Drive and DAT Tape Drives, Mirror offers the capacities, speed, features and prices you want.

Once you've used a Mirror high-resolution display, you'll wonder how you ever lived without it. Our monochrome full-page and two-page displays deliver bright, sharp screen images for word processing, spreadsheets, database management and publishing.

For graphic design, illustration or pre-press, choose a Mirror color display. Available in 14-inch, 16-inch and 20-inch models, there's a Mirror color display that's right for every job.

The top-rated Mirror Color Scanner makes it easy

to add sharp, vivid color images to your work at an unbeatable Mirror price; just \$1199 including Adobe Photoshop.

If you need a printer, take a close look at the MirrorImage 309 Laser Printer and the MirrorImage 415 Tabloid Laser Printer. With Postscript Level 2, RISC processors, sophisticated paper handling and durable, high-speed printing engines, these printers work hard, so you don't have to.

All Mirror products are backed by our famous 30-day, "love it or return it" policy*, and the best customer support in the business. Call today to see for yourself.

MirrorImage 415, Tabloid Laser Printer, features dual paper trays and a 15 pages-per-minute print engine. Leases available. \$3,199 ◀

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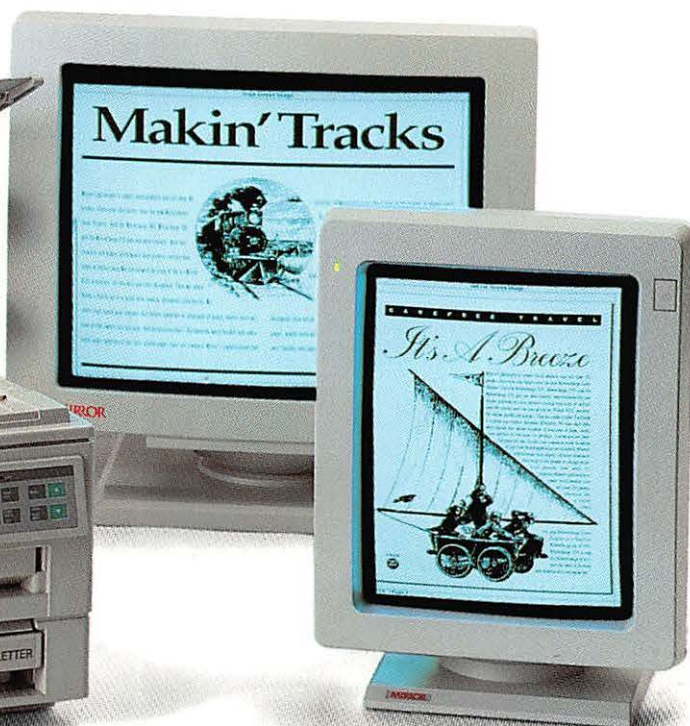
FAX 612-633-3136

MEDIA1029

19-inch Two-page Display w/ monochrome video card \$799
21-inch Two-page Display \$999*



MirrorImage 309,
Postscript 2 laser printer
\$1,699



15-inch Grayscale Portrait Display \$399*
w/ monochrome video card \$549

...And Powerhouse Perip

The NEW Mirror 14-inch Color Display is the latest version of our best selling color monitor. Designed to work with the built-in video of your Mac LC, IIsi, Ilci, or Quadra--or with Mirror's PowerVision video board for

PowerBooks--this display features razor-sharp focus and brilliant color and it's still only \$399!*

The **Mirror Pocket Hard Drives** and optional

Mirror PowerDock redefine storage convenience. For moving data between machines, or to expand your PowerBook's capacity, these tiny drives fit anywhere. Slip the Pocket Drive into the PowerDock and use a standard PowerBook battery to power the drive while you travel. When you're back home, the PowerDock does double duty and charges your spare battery.

Whatever your need, whatever Macintosh model you use, Mirror has high performance peripherals to match.

Our complete line of storage systems can handle any task. From our critically acclaimed hard drives and CD-ROM, to our high performance 128 MB Optical

Drives	Int.	Ext.
50 MB (Q)	\$299	\$339
85 MB (Q)	\$349	\$399
105 MB (Q)	\$389	\$439 ◀
127 MB (Q)	\$409	\$459 ◀
170 MB (Q)	\$449	\$499 ◀
240 MB (Q)	\$649	\$699 ◀
425 MB (Q)	\$1,049	\$1,099 ◀
595 MB	N/A	\$1,499 ◀
1 GB	N/A	\$1,999
128 MB Optical Drive	\$1,299 ◀	
600 MB Optical Drive	\$2,299	
44 MB SyQuest Drive	\$429 ◀	
88 MB SyQuest Drive	\$549	
DAT Tape Drive	\$1,399	
CD-ROM Drive	\$599	
44 MB Cartridge	3 for \$189	
128 MB Cartridge	\$59	
Quick! JPEG Board	\$599 ◀	

20-inch ProView Trinitron Display, 8-bit \$2,499

w/ 24-bit video card \$2,699 ◀

20-inch ProView V Color Display, 8-bit \$1,799

w/ 24-bit video card \$1,999 ◀

16-inch Trinitron Display \$1,099† ◀

w/ 8-bit video card \$1,499 ◀

w/ 16-bit video card \$1,599 ◀

w/ 24-bit video card \$1,799 ◀

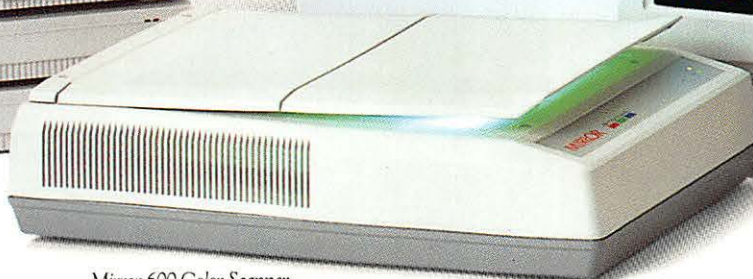
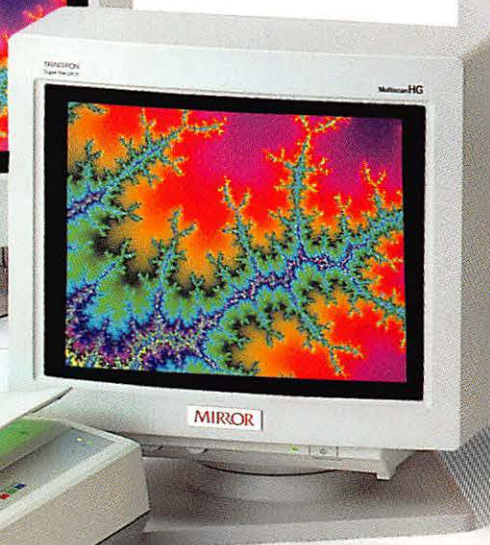
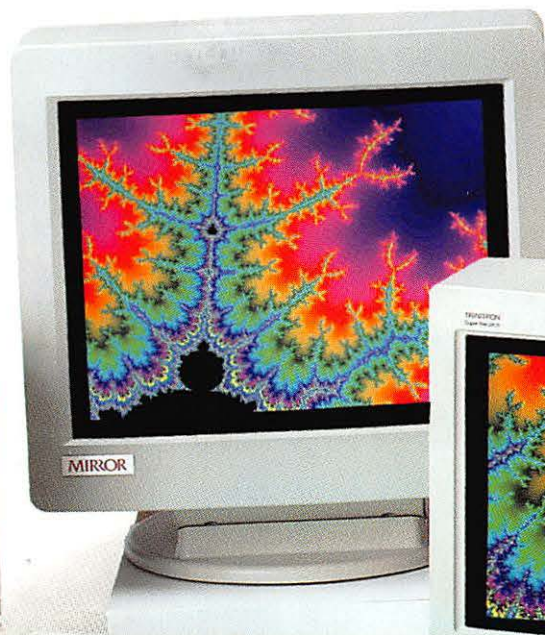
16-inch Color Display \$799† ◀

w/ 8-bit video card \$1,199 ◀

w/ 16-bit video card \$1,299 ◀

w/ 24-bit video card \$1,499 ◀

14-inch Color Display \$399†



Mirror 600 Color Scanner,
with Adobe Photoshop \$1,199

◀ **NEW**
Lower Price!

File

It
won't
hop.

Edit

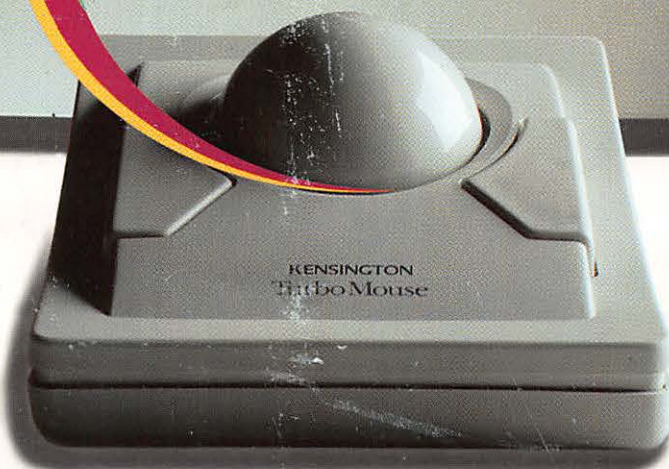
It won't skip.

Chooser

But wait till you
see it jump.

Turbo Mouse Control

Trash



While the cursor may hop or skip with some trackballs, Turbo Mouse® has always been known for its ultrasmooth movement.

Now, the latest version of Turbo Mouse is known for something else—jumping. Our new Brilliant Cursor technology makes it possible.

With it, you can move the cursor instantly to predefined HotSpots on the screen, such as the File and Edit menus and the Trash icon.

First, you define your HotSpots. Then, click a button and move the ball in the direction you want to go. The cursor automatically jumps to the predefined HotSpot. You can even program in different HotSpots for different applications and for different users.

And Brilliant Cursor technology is not all that's new with Turbo Mouse 4.0. Also new is advanced acceleration with three levels of control and Enhanced Mouse Buttons that let

you execute one of seven programmable commands. For example, send a Print command with just one click using Send String. Or move the cursor with ultra precision using Slow Cursor. Even save different combinations of commands for each of your favorite programs.

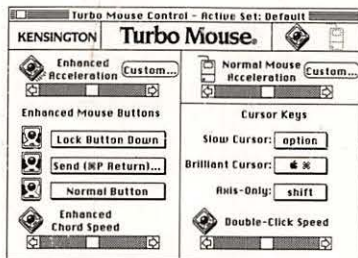
Then there's the award winning Turbo Mouse hardware. Hardware that has won more awards than any other input device. Hardware that has consistently been voted "Best Input Device" by Macintosh

users worldwide. Features include a large comfortable ball, "easy-click" buttons, long-lasting precision stainless steel bearings, and two ADB ports for chaining other devices.

Turbo Mouse 4.0 is fully System 7.0 compatible. To receive information by fax, call 800-535-4242, dial 82 and request document 320. For general information, call 800-535-4242. Outside the US, 415-572-2700.

Introducing Turbo Mouse 4.0

With the all new Brilliant Cursor™ technology,
you can actually make the cursor jump
to any spot on the screen.



KENSINGTON

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